CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

OCTOBER 1, 19
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SEVEN DOLLAR

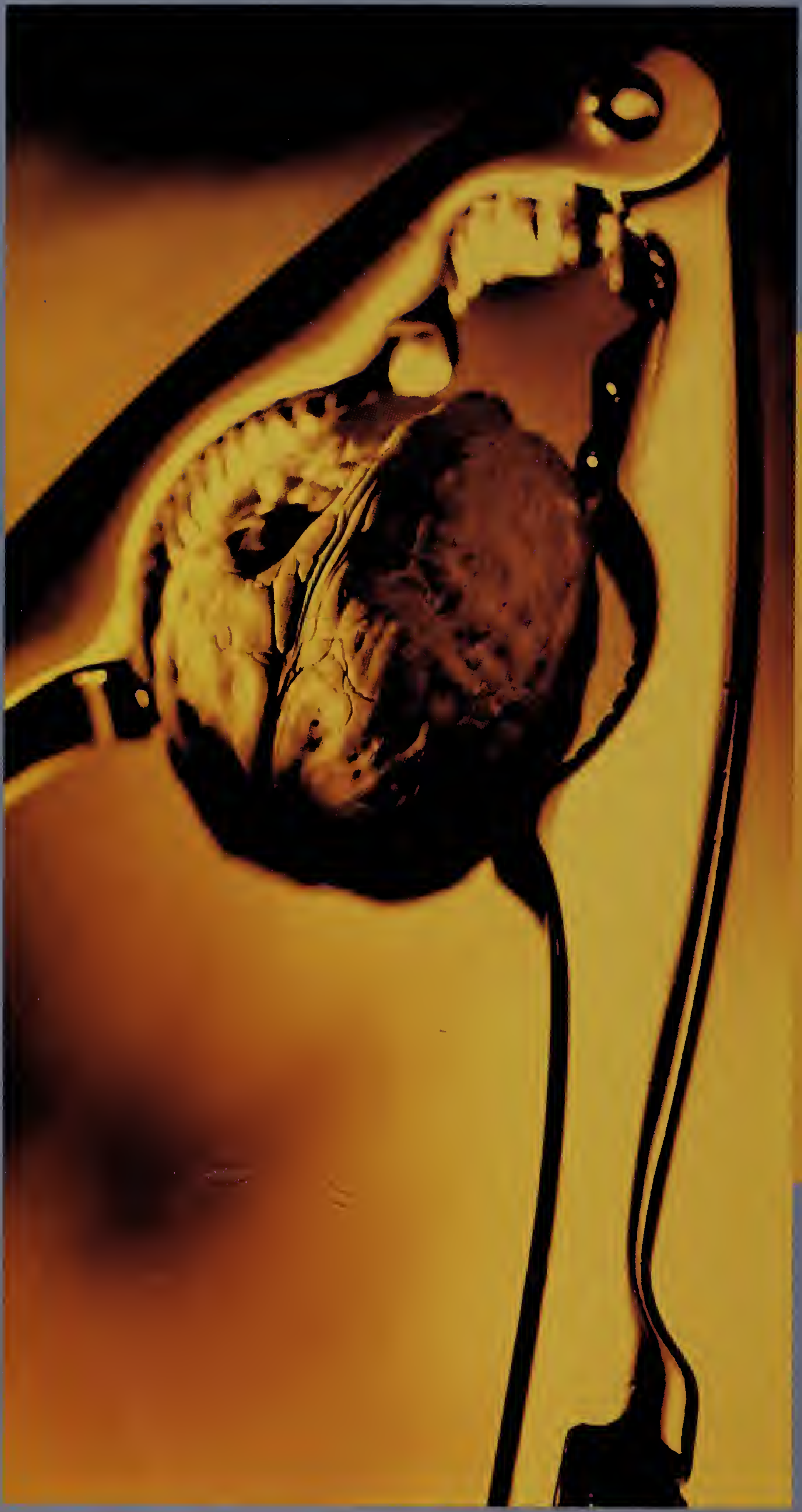
COVER STORY:

Partnerships To Help POS Bear Fruit

Proving The Value Of CASE

Ralphs Grocery Co.'s
Edwin Gropp

AN INTERNATIONAL DATA GROUP PUBLICATION



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CIO

VOLUME 5, NUMBER 1

COVER STORY

Store-Crossed Lovers

40

In a marriage made at the point-of-sale, retailers and their suppliers are forming partnerships based on a mutual need for strategic information.

By Meghan O'Leary

IT adds wiles to the aisles **40**
Cover photo of Edwin Gropp by Alan Levenson

FEATURES

Brooklyn Gas's Main Event

20

Bill Feraudo took some pretty big risks when he set out to build an object-oriented customer-information system from scratch. Now he expects it will fuel the utility's success well into the future.

By David Freedman

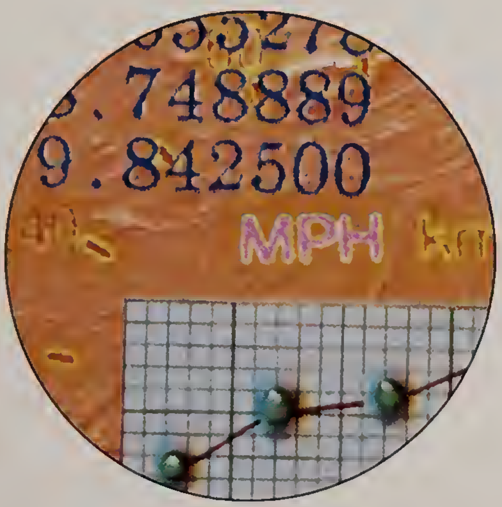
Proving the CASE

28

Costly software-development strategies put a greater burden on IS budgets, so it's important to be able to quantify the payoff of the investment—both to management and to IS professionals.

By Richard Pastore

Information pipeline **20**



The case for CASE **28**

MORE ▸ ▸ ▸

We Can Sum Up Our Competitors' Approach To I-CASE In Two Words:

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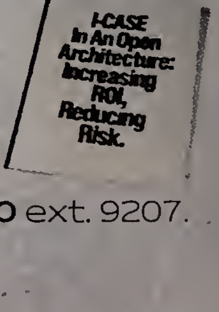

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FEATURES (continued)

Beat the Reaper 50

Ailing companies can sometimes cheat death by means of a well-managed turnaround effort, with IS playing a critical role in the rejuvenation.

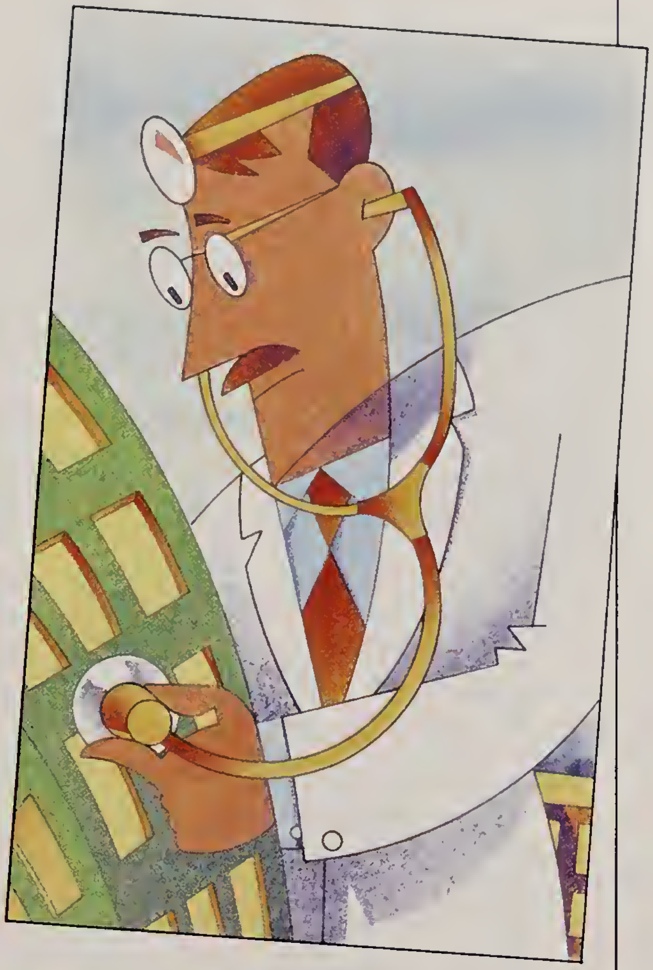
By Thomas Kiely

COLUMNS

STATE OF THE ART: WORTH THE WAIT 60

For all the hoopla surrounding the non-arrival of ISDN, the technology has been quietly proving itself to a core of satisfied users. Now, with new developments in applications and compatibility, the time may finally be ripe for the technology to take off.

By H. Paris Burstyn



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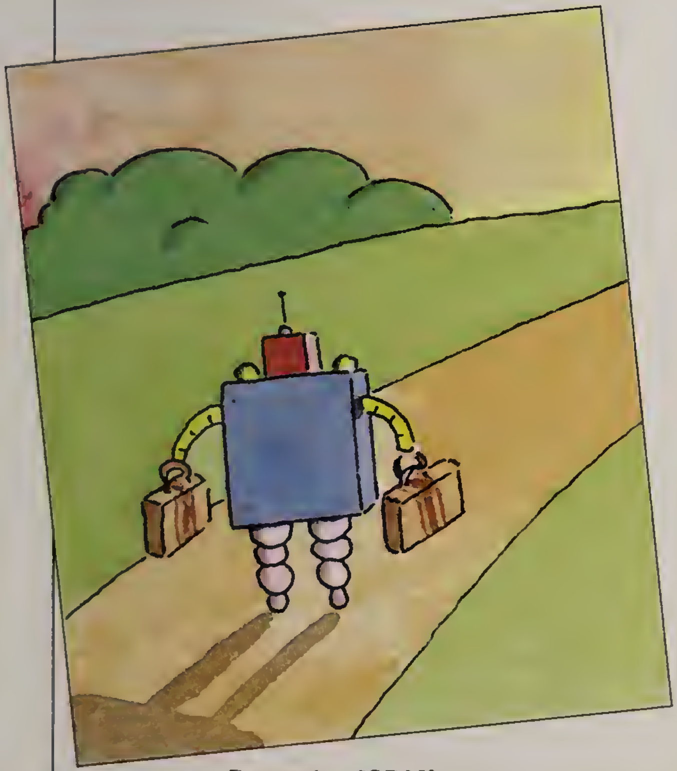

Remember ISDN? It's quietly arriving. **60**

Computer-aided crash tests **12**

With information technology such a visible part of the corporate landscape, CIOs are increasingly under pressure to measure in business terms the payoff from implementing technology. Expenditures are under scrutiny as IS organizations shed layers and settle into the "do more with less" mind-set.

Now that CASE and other development methodologies are becoming established—though costly—IS tools, CIOs are seeking ways to measure their contribution to productivity, quality, efficiency and economy. In his article "Proving the CASE," beginning on Page 28, Staff Writer Rick Pastore examines the pursuit of measurements for justifying the adoption of CASE and other expensive software-development strategies. While many information executives are hard at work devising metrics, fewer than 30 percent of the largest companies are measuring the efficacy of software development, let alone justifying CASE to cost-conscious management, according to one leading analyst.

Those CIOs who are beginning to evaluate CASE are looking at both objective and subjective criteria. For productivity-related measures, function points seem to be the most prevalent technique, but according to some executives, this method leaves too many variables untested. On the softer side, measuring the quality of systems is a technique some information executives are adopting.

Unfortunately, all of the approaches to measuring CASE are imprecise and generally lie outside the realm of corporate accounting norms. Nonetheless, information executives at companies such as Lubrizol, Manufacturers Hanover and Caterpillar are in the process of developing metrics that can be translated into business benefits. Caterpillar, for example, views users as critical judges of the business performance of applications developed using CASE. It's a matter of being able to translate the IS benefit into business objectives, such as cost reductions or the ability to produce cheaper or more reliable products.

Compounding the problem is the discomfort most IS professionals (or any employees, for that matter) feel at having their work scrutinized. Information executives have to be sensitive to probable resistance from their staffs. Companies such as Kodak have addressed this problem by appointing a limited number of employees to oversee measurement gathering.

Sadly, the organizational challenge of the CIO always seems further complicated by arcane technology. But no one said it was going to be easy.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL

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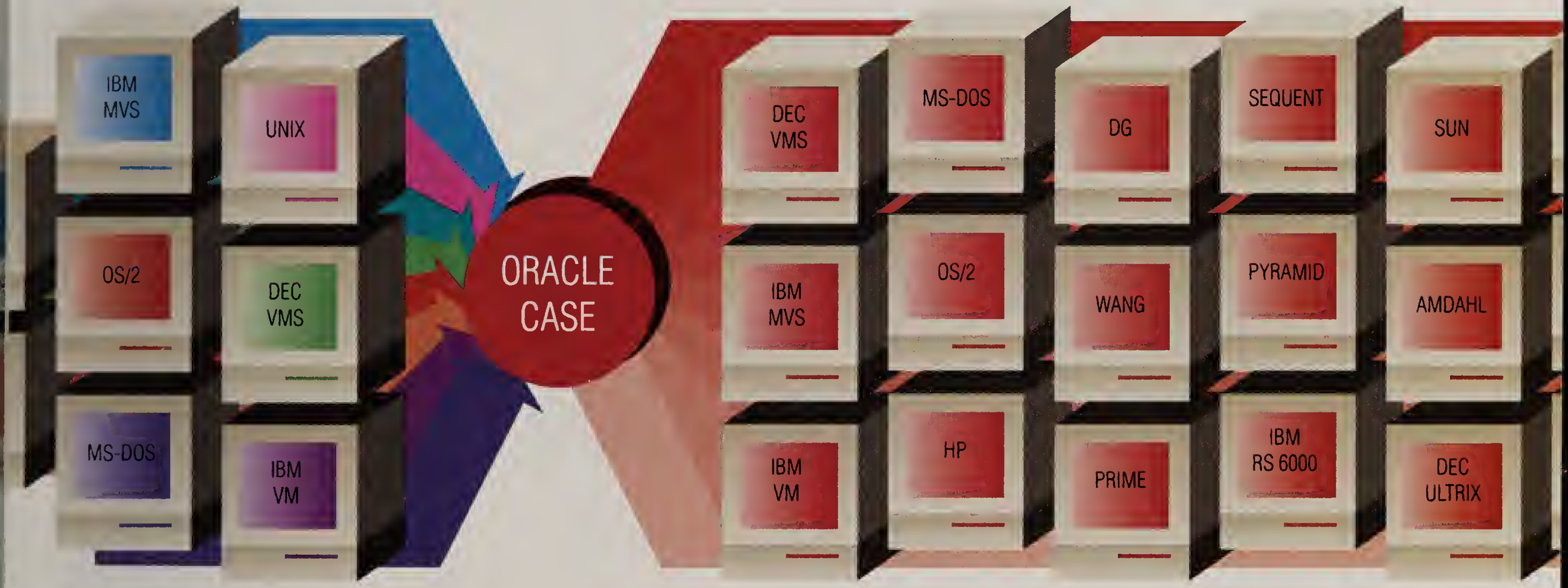

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Chief Technology Officer
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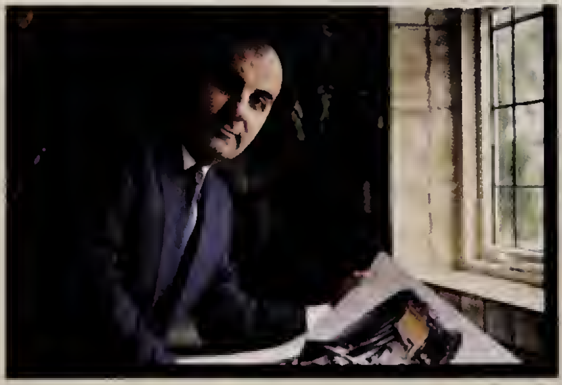

"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development.."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce

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Venkat (Vinnie) Tiruviluamala
Director, CPC/CPPC Information Systems
SONY Corporation

"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

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The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

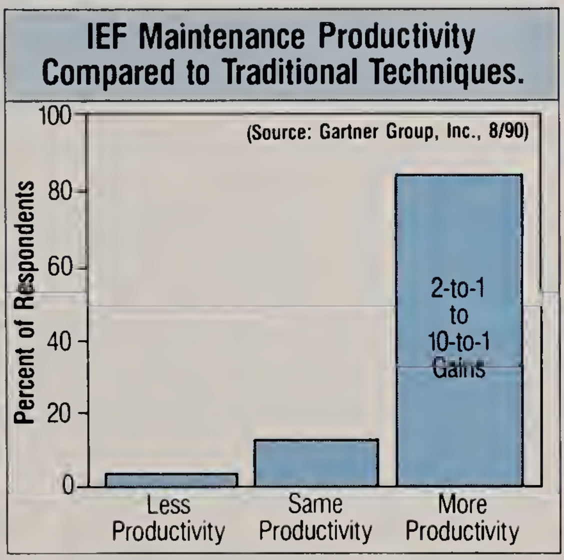
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) *IEF developers reported zero defects—not one abend had occurred in IEF-generated code.*

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

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The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will follow. We are committed to increased environmental independence in support of the Open Systems concept.

We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's COHESION—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

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LETTER FROM THE PUBLISHER

PHOTO BY GEORGE SIMIAN

The issue of workforce literacy is beginning to gain much-needed attention from top management. Numerous articles on this subject have appeared in such publications as the *Harvard Business Review* and *The Wall Street Journal*, as well as in *CIO* Magazine's pages.

Executives are starting to realize that we must deal with this crisis if American business is to prosper throughout the next century. If the skill level of the U.S. labor pool continues its downward spiral; if we don't stem the high-school dropout rate; if we don't introduce innovative education programs to capture the imagination of grammar-school students; then the next generation of workers will be unprepared for the competitive challenges that lie ahead. And American business will surely suffer.

CIO Publishing is doing its part to educate CIOs and other senior executives on this issue and to help build strategies to attack it. For example, our CIO Perspectives conference last month provided a forum for business executives, educators and opinion leaders to explore the workforce-literacy crisis and share information on how many companies are already making improvements through innovative work-based learning and educational-outreach programs with their local schools.

I'm interested in learning about any such programs you might have in place at your companies. This information will help a growing group of CIOs and other information technology business executives who are developing a national award for educators aimed at improving our education system and properly preparing our next generation of workers.

Please tell me about your educational initiatives by writing to me at CIO Publishing, 492 Old Connecticut Path, Framingham, Mass., 01701-9208. Or you may fax the information to me at 508 872-0618. Thanks for your help.

Coming In CIO

Strategic Outlook: Outsourcing

A practical guide to outsourcing offers readers direction in deciding whether or not to outsource, choosing a vendor and negotiating a contract. Also: a textbook example of a successful outsourcing arrangement and, for the stout of heart, horror stories about arrangements that went wrong.

Concurrent Events

In manufacturing companies, concurrent engineering speeds the journey of products from idea to finished reality. Where does the CIO stand in this new process? In many cases, he or she stands in the background, helping but not directing.

Town and Gown

Universities with IS graduate programs are forming partnerships with companies that theoretically should benefit both sides. Representatives from business and academia discuss whether such alliances are making the grade.

O.K. What do you remember about wavelength division multiplexing?

Not much.

Which is hardly surprising when you consider such advanced telecommunications concepts weren't even on the blackboard when you were last in front of one.

Today, however, megabits, bandwidth and real-time end-to-end connectivity are as much a part of the way you do business internationally as the handshake.

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TRENDLINES

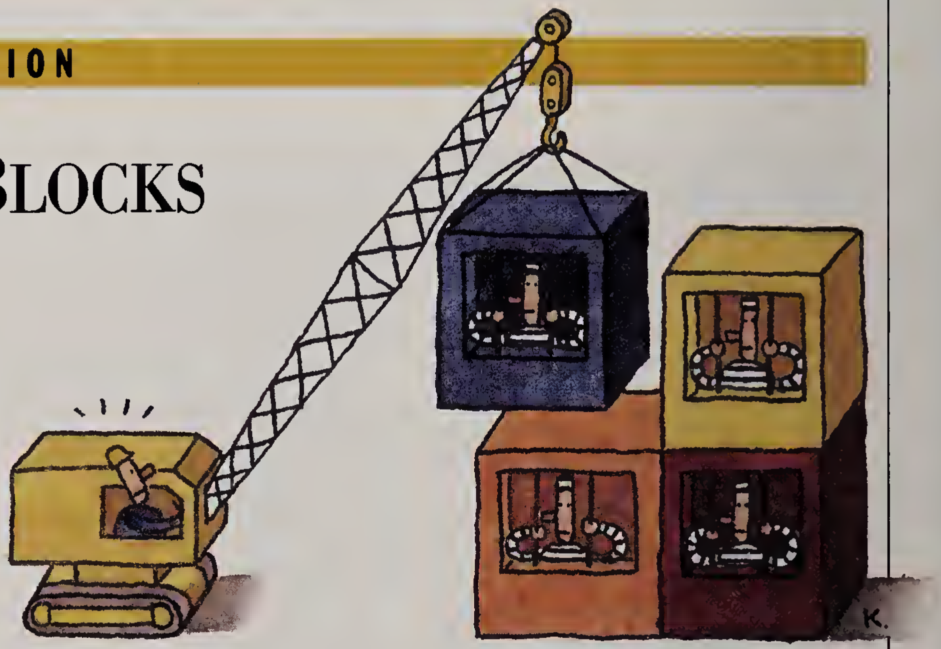
FLIPPING OUT

Whole generations that grew up in ignorance of Nintendo did not, miraculously, lack for significant games to play. One of the chief forebears of the electronic game—the pinball machine—still has plenty of adherents who thrill to the tactile, slightly sweaty-palmed, connection between player and game. We don't want to get too physical here, but pinball is a whole-body experience (why, it's virtually a sport) calling for the utmost in timing, instincts, reflexes, grace and intuition. In return it offers flippers, bumpers, flashing lights and bells.

In addition, of course, it has its own expo. This year's—the seventh annual—convenes at the Ramada Hotel in Rosemont, Ill., the weekend of Oct. 25-27. Scheduled events include a tour of the Bally Manufacturing Co. (a leading maker of pinball machines) and a tournament. Hundreds of machines will be on display, both to be played on and bought. For more information on Pinball Expo '91, contact Robert Berk at 800 321-2722. ▬

PRISON CONSTRUCTION

JAIL HOUSE BLOCKS



Information technology helps catch criminals and speed them through the courts. Now, thanks to computerization, a New Jersey company thinks it may have the answer to prison overcrowding all locked up.

Mark Correctional Systems uses a computerized assembly line to manufacture modular steel prison cells that can be added to existing facilities or retrofitted into empty buildings. The 6,000-pound cells, less than a fifth the weight of ordinary concrete cells, can be stacked and bolted together using the company's patented bolting mechanism. According to Michael J. Rosenberg, vice president of sales and marketing, Mark's computerized process allows the company's Maywood factory to turn out 3,500 cells a year; 1,200 cells can be assembled and stacked at a job site in 30 days. "We shrink-wrap them like a bottle of perfume, deliver them to the job site, and all that's left to do is bolt them together and put in the utility lines," he said.

Mark works to client specifications, using computer-aided design to manipulate the numerous custom options included with each order. Purchasers, who include state and city correctional departments, as well as some private organizations, can specify such features as the size and shape of windows, the number of bunks, types of lighting fixtures—even what the toilets are made of. "If you tell us an hour before the cell goes into the factory that you want to change from a square window to a round window, we can make that change with just a few keystrokes and relay it to the factory floor in about 20 seconds," said Rosenberg. Customer designs are then stored on floppy disks, so the cells can be duplicated, expanded or modified.

Mark has installed about 15 projects in the past two years, ranging from two-bed to 208-bed facilities. At $12,000 per two-bed cell, the modular units are about half the price of traditional prison construction, according to Rosenberg. "It's economical and fast to construct, while also providing a humane environment for the prisoner," he said. ▬

APPLE SEEDS

Apple Computer Inc. seems determined to punch holes in Corporate America's resistance to the Macintosh for mainstream business computing. First there was this summer's pact with corporate darling IBM. Apple followed that up at the Boston Macworld Exposition with the announcement of a licensing agreement that gives Mac users access to host-based software from Computer Associates International Inc.

The agreement calls for CA to develop and distribute server software that enables Macs equipped with Apple's Database Access Language (DAL) to access information from CA-DATACOM, CA-IDMS and CA-DB databases. CA will also market Apple-developed DAL server software that supports IBM's DB2 and SQL/DS. Apple has already licensed DAL to Data General Corp., Tandem Computers Inc. and Novell Inc., among others.

The Apple-CA products are scheduled to begin appearing this calendar year, with the bulk showing up in 1992. ▬

E-MAIL SURVEY

ELECTRONIC TALK ISN'T CHEAP

Electronic mail is increasingly becoming the glue that helps to hold networked, decentralized, widely dispersed corporations together, and businesspeople are taking greater advantage of the medium to speed and reduce the cost of communications. Still, the overall cost of E-mail is greatly underestimated by most businesses, according to a recent report from Ferris Networks of San Francisco.

ILLUSTRATION ABOVE BY JAMES KACZMAN; BELOW BY FRAN O'NEILL

TRENDLINES

The report, entitled "Integration of PC Network E-mail," states that while most estimates of the annual cost of E-mail per user hover at around $100, the true cost is almost 10 times that figure. The $1,000 estimate comes from figuring in the cost of gateways, support, training and "hidden costs" such as self-teaching and unproductive or personal time spent on E-mail. (The report also analyzes E-mail standards, trends, products and vendors.)

Based on interviews with 50 Fortune 1000 E-mail evaluators, case histories, vendor interviews and market research, the report states that about 80 percent of E-mail system costs in the first year are operating and training costs that cannot be leveraged. And these costs are likely to rise as the E-mail system grows because more complex networks require more support staff, gateways and administrative software. Installation costs for network E-mail systems are generally higher than users believe and vendors advertise because cost analyses do not usually include training, hardware and software installation, and the gateway and administrative software required for complex network environments.

The cost model assumes a stable E-mail system, trained support staff and efficient design. It also assumes 50 users per server in an isolated workgroup, and 100 users per server in large single sites and multiple sites.

Despite E-mail's surprisingly high cost, ad hoc studies indicate that its use generally results in a reduction of secretarial tasks; faster, uninterrupted communications and fewer meetings. They also suggest that E-mail can increase the quality and quantity of work output, create new information uses, allow users to handle more information and improve creativity. Not bad for $1000 a head.

NEW VENTURES

The Multimedia PC Marketing Council has been established as an incorporated subsidiary of the Software Publishers Association. The Council's charter is to educate end users on multimedia personal computing within the business, education and consumer marketplaces, and to promote the Multimedia PC platform to independent software vendors.

Founding members of the Council, including AT&T Computer Systems, Microsoft, NEC Technologies and Tandy, unveiled plans to use a special "MPC" trademark to indicate hardware and software compatibility with the previously announced Multimedia PC specification. The trademark is intended as a symbol of plug-and-play functionality in the same way that the VHS trademark signals compatibility between VCRs and blank and prerecorded tapes.

Companies interested in joining the Multimedia PC Marketing Council or in licensing the MPC trademark should call Ken Wasch, executive director of the Software Publishers Association, at 202 452-1600.

AUTOMOBILE DESIGN

A CRASH COURSE IN CAD

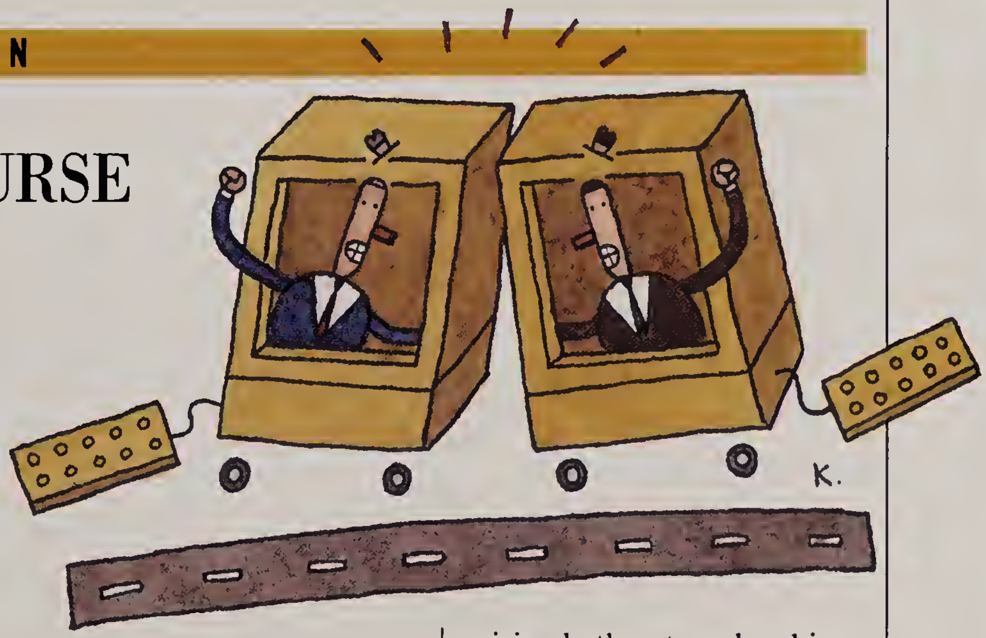


ILLUSTRATION BY JAMES KACZMAN

When Ford Motor Co. recently went touring to show off its sleek new computer-aided design and simulation capabilities, it also revealed the management baggage that rides along with such state-of-the-art techniques.

Like its factory assembly lines, Ford's car design traditionally moved sequentially from exterior design to components design to prototyping to manufacturing engineering. By sharing CAD-derived prototype data, different development teams can now work on their projects simultaneously. The short-term goal is to trim one year from the standard 3½- to 6-year car-development process.

In recent months, Ford has developed a computer model to simulate the workings of a driver-side air bag during a collision. It is also using computer simulations to follow airflow under the hood and to study the effects of 30 mph front and side impacts. Here the goal is to cut costs by reducing the number of car prototypes built from, say, 40 to five or six.

But along with the positive results come cultural concerns and management headaches. Though senior management's reception of the technology is reportedly positive, it has been "very hard learning to make decisions based on simulations and drawings instead of the real thing," said F. Gordon Willis, Ford's director of product and manufacturing systems for Car Product Development. For the benefits of simulation to be realized, "somebody has to believe it," he said. Ford still crashes a few cars toward the end of the development cycle just to make sure.

Finding qualified people to work with these technologies is a serious problem, Willis said. Training the large user base is also a major chore, requiring both external and internal training programs.

Another concern is data-handling discipline and speed. Because of the complexity and size of the designs and simulations, "a lot of engineer time is spent finding the data and figuring out where to put it," Willis said. "We need to make sure they're treating and storing it in the same way." Compounding the problem, data analysts' workload has tripled as computer modeling and CAD have become more mainstream.

Ford's solution is to deploy data-management software to keep track of data and walk users through their tasks. Ford developed the management tool internally to suit the engineers' process. It has worked so well for Car Product Development that it is being expanded to other areas, Willis noted.

1975 *Launched the first U.S. public data network.* 1979 *Built the first commercial private packet network.* 1980 *Introduced the first major public e-mail servic*

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1988 *Sprint completes the only nationwide 100% digital fiber optic network. Sprint awarded 40% of FTS 2000 contract.* 1989 *World's first and largest privately-owned*

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transatlantic fiber optic cable completed. 1990 *Sprint announces the first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

TRENDLINES

COURT AUTOMATION

CURBING WELFARE FRAUD

ILLUSTRATION BY JAMES KACZMAN

For welfare cheats in Detroit, the hanging judge is an information system. Motor City's Recorder's Court has developed a system that helps to process welfare fraud cases in as little as 9.6 seconds per case, saving millions of dollars.

It works like this: Michigan runs computer checks on welfare recipients quarterly, matching them against income databases, such as tax and payroll records.

In its first run in August 1986, the state identified 23,000 people who drew both public assistance and some other paycheck.

After the cases are investigated, the computer generates arrest letters that are mailed under the aegis of the State Police.

If they acknowledge the overpayment, defendants are diverted out of the criminal track and assigned a court date. In the courtroom, judges tap into data compiled by investigators that allows them to process 120 cases in just 20 minutes. Offenders receive a 10 percent reduction in their welfare benefits.

Those who are no longer receiving benefits are required to make payments, which are tracked by an automated recoupment system. Failure to make payments results in the case being passed through a new debt-collection system to the state Treasury Department for tracking and enforcement.

The Recorder's Court estimates that it once cost the state and Wayne County taxpayers $3,400 per case to prosecute welfare scofflaws; it now costs just $75 per case—a savings of $2.8 million last year. The Court hopes to see an additional $5 million to $6 million in savings each year. The system itself took five years to develop.

The Recorder's Court is also completing an expert system to handle felony arrests. Depending on the crime, the circumstances and the defendant's previous record, if any, felons and their attorneys can see the likely sentence the defendant will face if found guilty. (Michigan has had mandated sentencing guidelines since 1984.) Judges and prosecutors have access to the same information. It is hoped that this will facilitate plea bargains.

HOPE FROM THE HEADHUNTERS

The state of the economy is measured by indicators ranging from consumer spending to housing starts. Yet another indicator is the level of executive-search activity, and according to the latest findings, things in the headhunting business are looking up.

The Association of Executive Search Consultants in New York reports that the number of searches for executive positions increased 9 percent during the second quarter of 1991, according to President Glenn Van Doren.

The biggest increase based on salary was for executives earning less than $100,000—up 22 percent over last quarter. Demand for public-relations and communications executives posted a 30 percent increase.

RING ME UP, SCOTTIE

Imagine our disappointment. Work had reached a standstill while we agonized over the title of the *Dr. Who* episode in which the Doctor and Leela encounter the Master in Victorian London. Finally, with the answer practically within our grasp, we discovered the only information available was on such subjects as the 90-day T-bill rate and safety engineering for organic peroxides.

The source of our frustration was KDS/VOX, an expert voice system that provides knowledge or support interactively over the telephone. The system speaks in a natural voice, and users respond by pressing the buttons of a regular touch-tone phone.

KDS provides clients with run-time software and a CASE tool for developing intelligent systems. It can also build an entire turnkey application of up to 24,000 rules.

In a clever marketing ploy, the company has set up a 24-hour demonstration line that allows callers to try out 14 sample applications on subjects ranging from plastics manufacturing to episodes of *Star Trek: The Next Generation* and *Dr. Who*. But alas, when we called the system (at 708 251-4975) nary a mention was made of Captain Picard or our favorite Time Lord. Frustrated, we called KDS President Barbara Wallace, who assured us that the information was available in a submenu—accessing it was simply a matter of pushing an extra button.

Using 16,000 rules, the expert system correctly identified the *Dr. Who* episode ("The Talons of Wang Chan,") and a *Star Trek* episode (questions included "Does Riker have a beard?").

KDS's latest project, according to Wallace, is an application that will help people fill out their personal tax returns. Which is good news for taxpayers who are tired of relying on the IRS for science fiction.

Given the situation, a recovery plan is advisable.

You wouldn't go ice climbing without a safety rope. So, why risk your critical CICS/VSAM data by failing to protect it against unexpected data loss or disaster?

If you don't provide recovery software for your CICS/VSAM data, you are jeopardizing your ability to return to full operating capacity following a disaster. Insuring rapid recovery with full integrity of lost or corrupted data must be a disaster recovery priority.

Now when you face this challenge, you can turn to the experienced professionals to provide your recovery software across multiple platforms. The leader in CICS/VSAM data recovery, Integrity Solutions, Inc., has joined BMC Software, Inc., the leader in database and data communication products for IMS, DB2 and CICS.

BMC Software has the CICS/VSAM products you need for on-site recovery and data center disaster recovery. The CICS Integrity Series consists of four products that provide automated management of your CICS and batch VSAM recovery environments: RECOVERY PLUS for CICS, RECOVERY PLUS for VSAM, JOURNAL MANAGER PLUS, and DATA VAULT.

For more information, FAX your request to 713 242-6523, or call BMC Software at **1 800 841-2031**.

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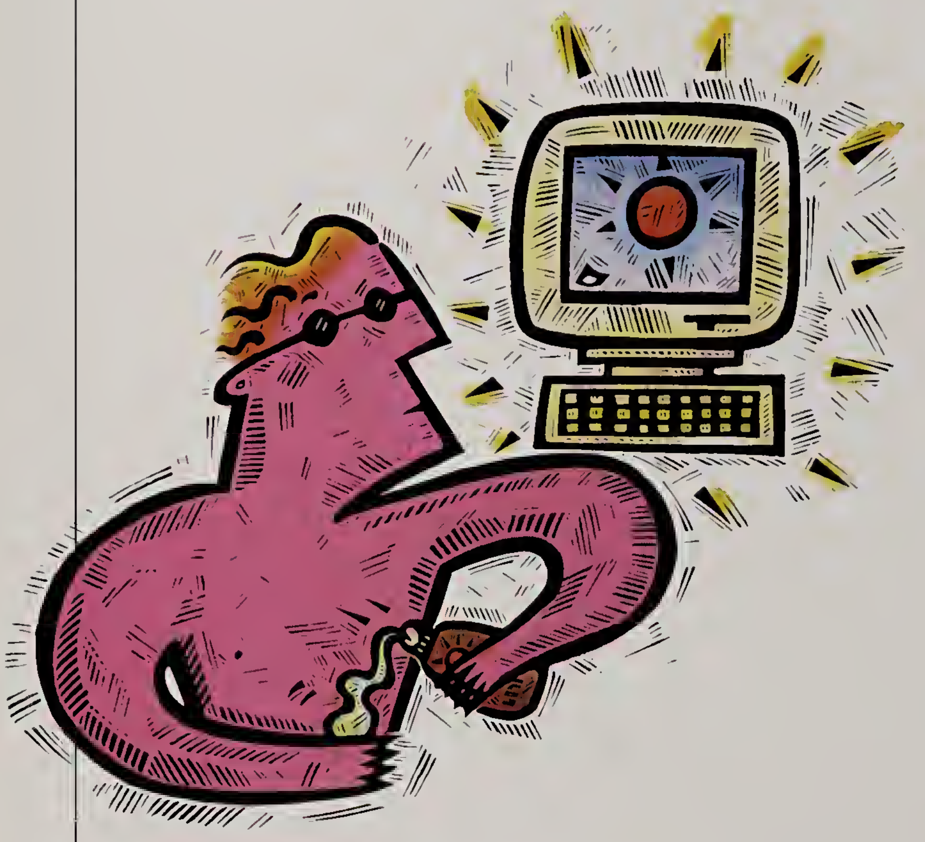

SCREENING OUT THE RAYS

Unlike sun worshipers, computer users can't protect themselves against radiation by applying gobs of oily lotion. Instead users have to rely on vendors and the equipment they offer. In an effort to accede to the demands of health-conscious consumers, Computer Lab International (CLI) has converted its entire line of video display terminals to low radiation.

CLI, based in Anaheim, Calif., designs, manufactures and markets peripherals for IBM midrange and mainframe systems. "The demand for low-radiation terminals is escalating rapidly," said Executive Vice President T.C. Lin. And according to Lin, it's the consumers, rather than the government or vendors, who are driving up the market. As proof of this trend, Lin cites CLI's sales of low-radiation terminals, which have increased 60 percent for two years running. Lin said that CLI will continue to develop its technology in order to meet or exceed the Swedish ELF radiation standards.

VOICE/FAX INTEGRATION

DIALING FOR DOCUMENTS

Hello, this is the fax-mail system. . . . " The familiar voice-mail salutation will soon broaden its vocabulary as the systems begin branching out to support other forms of messaging. Voice-mail systems of the near future will provide telephone access to facsimiles, electronic mail, host-based data and, as bandwidth becomes cheaper, even video images, according to a report by Houston-based Information Publishing Corp.

Support for fax messaging already accounts for $20 million, or approximately three percent of the total value of voice-response systems. That value will grow to 18 percent by 1995, the report predicts.

With a voice/fax-mail system, a traveling executive can dial up the office and retrieve not only his or her voice messages, but any documents that demand immediate attention. The executive can issue retrieval instructions via the phone's touch-tone keys or by spoken word to voice-recognition systems, and the document will be sent electronically to any nearby designated fax machine. Enhancements that make this possible are primarily software upgrades and one or more fax add-in boards, typically a $25,000 to $30,000 additional overall investment, the report noted. AT&T's Audix software upgrade costs $6,000, plus another $1,000 per add-in board.

The technology of voice/fax processing will not only make fax mail possible; it will also spur the market for enhanced facsimile services such as fax bulletin boards. These services, valued at only $245 million today, will expand to $1.2 billion in 1995, according to the study.

The Information Publishing report also looks beyond current capabilities of voice/fax messaging systems to future functionality that will allow text-to-voice conversion. Conversion to voice would make a computer terminal or fax machine unnecessary on the receiving end. The traveling executive would simply have his E-mail and faxes read to him over the telephone.

CLARIFICATION

The profile of New England Power Service that ran in the electric-utilities section of the August CIO-100 issue may have misled readers on a couple of points. While the percentage increase in IS spending at NEPS is "atypically high," writes Vice President and Director of IS Eric Cody, "spending as a *percentage of total revenue* remains below average." Cody also wanted to clarify that credit for gaining top executives' approval for investment in new IS projects should go to NEPS's assistant controller rather than to IS.

CAREER MOVES

MICHAEL S. HESCHEL, formerly chairman and CEO of Security Pacific Automation Co., has joined the Kroger Co., of Cincinnati, Ohio, as group vice president of MIS. Heschel, one of the gray eminences of IS management, previously has held top IS positions with Baxter Healthcare Corp. and (prior to its merger with Baxter Travenol) American Hospital Supply Corp., developer of the ASAP order-entry system. He also chairs the Information Systems Committee of The Conference Board. Heschel succeeds JACK G. HUDSON, who is retiring after 32 years with Kroger, a supermarket chain.

JAMES R. CHAMBERS has been promoted to the IS vice presidency of the Nabisco Biscuit Co., of Parsippany, N.J., an operating company of Nabisco Brands Inc. Chambers has been with the company since 1981, most recently as a "category business director." Nabisco Biscuit Co. is the maker of leading cookie and cracker brands, including Oreo, Ritz and Triscuit.

ILLUSTRATION BY FRAN O'NEILL

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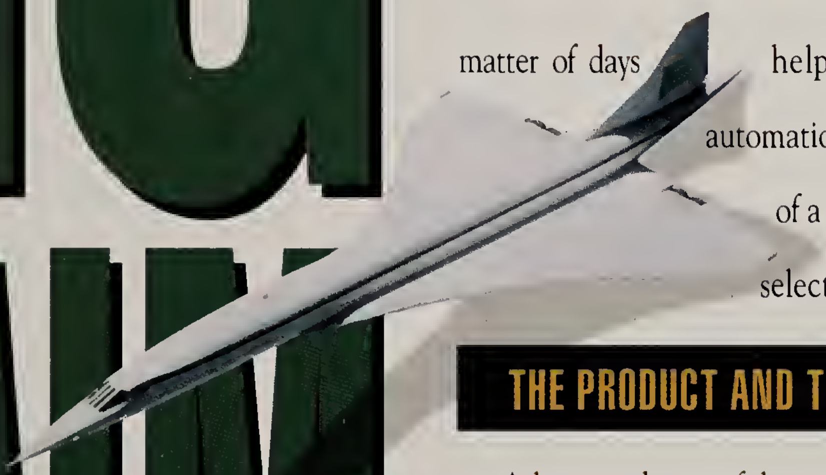

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BROOKLYN GAS's MAIN EVENT

Bill Feraudo took some pretty big risks when he set out to build an object-oriented customer-information system from scratch. Now he expects it will fuel the utility's success well into the future.

BY DAVID FREEDMAN

BILL FERAUDO LOOKS EVERY BIT THE CAREER EMPLOYEE of the Brooklyn Union Gas Co. Wearing shirtsleeves that do little to soften his fireplug build and barking out greetings and orders in a Brooklyn-steeped tone that sounds at once friendly and harassed, Feraudo would seem perfectly in place directing a gas-main repair crew in the middle of Flatbush Avenue.

Feraudo's actual responsibilities at the natural-gas utility, however, are somewhat different.

PHOTO LEFT COURTESY BROOKLYN UNION GAS CO. PHOTO RIGHT BY KENT HANSON

BILL FERAUDO: *"Most companies wouldn't have taken the risk. It showed our managers understood how important technology is to the business."*

Networking.

Without fresh information

Some say "the network is the system," but we say your network is your *business*. In fact, without a good network you could be out of business.

Unfortunately, for too many companies, networking is not working. Or, not well enough.

Often it's because computer systems once chosen to solve problems are now causing them, because they can't communicate.

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For example, we're now helping UCLA build a

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We're also a leader in OSI, with OSI offerings across all IBM platforms. And our SNA networks are open to a wide variety of non-IBM systems.

What's more, IBM's network management systems are the industry's most robust, which is why Santa Fe Railway is using IBM NetView® for automating operations and to control not just their LANs but costs as well.

You can also tie into the IBM Information Network for worldwide communications with customers and suppliers. And you can use voice-enhanced solutions like IBM CallPath™ to greatly improve customer service.

But technology aside, the point is to get information flowing more freely around your company. And it's no longer just a good idea, it's an absolute business imperative.

Networking shouldn't be done piecemeal; you have to consider all the pieces at once—no matter who made them—and IBM has the resources for helping you do that.

To learn more about IBM networking, talk with your IBM marketing rep. Or to have one call you, call us at **1 800 IBM-6676, ext. 880.**

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> *"It was embarassing. We had done such a good job of building an integrated system that we just couldn't take it apart to fix it."*
>
> *–Bill Feraudo*

For one thing, Feraudo, who is a vice president, has had responsibility for the planning and construction of the utility's just-completed corporate headquarters, a contemporary and commanding presence in downtown Brooklyn that is replacing the company's current drab digs. But it is his other main achievement over the past half-decade—managing the development and implementation of the company's new customer-related information system (CRIS)—that has Brooklyn Union's executives most excited.

A gas company may not seem a likely breeding ground for future directions in customer-information systems, but Brooklyn Union has impressive demands. Serving 4 million customers throughout Brooklyn, Queens and Staten Island, it's the fifth-largest gas utility in the United States. Besides collecting customers' money, the company has to track about 1 million meters, open and close accounts, respond to billing and service complaints and direct its 450-person field-service crew to perform repairs, install equipment and respond to reports of gas leaks.

BROOKLYN GAS'S *CRIS alerts managers to leakage reports, enables automated meter reading and makes assignments to repair crews through hand-held computers in every truck.*

PHOTO ABOVE AND BELOW LEFT BY KENT HANSON, PHOTO RIGHT COURTESY BROOKLYN UNION GAS CO.

In the late 1960s, Brooklyn Union built the third online system in the world, preceded only by American Airlines and CBS. In 1971 that system was replaced by one that integrated all customer functions. Costing $4 million—70 percent of which went to hardware—the system's online capabilities were so advanced that IBM, which helped develop it, used the software as a precursor to what later became its main online environment, CICS. All the code was heavily optimized to cut down on hardware costs; even customer profile data was numerically coded rather than spelled out in the database, to save disk space. The drawback was that the system was expensive to alter. But as the company's information needs grew, it had little choice but to tack on new code.

In the early 1980s Brooklyn Union realized it had a problem. "After 10 years of patching, the system had become very hard to maintain," said Feraudo. "Even making the simplest change took forever." The builders of the system, for example, hadn't envisioned the possibility of a gas bill greater than $99,999.99, and thus had left room for only seven digits. When bills for its largest customers started routinely topping $100,000, the cost of adding the extra digit would have been so high that the company simply displayed dollars on one record, and cents on another. "It was embarrassing," said Feraudo. "We had done such a good job of building an integrated system that we just couldn't take it apart to fix it."

That wasn't the worst of it. By the mid-'80s, government regulation of the natural-gas industry had mushroomed, driving gas utilities to seek out new niche markets for their growth. Brooklyn Union quickly geared up to make the transition to a market-driven business, even hiring top marketing people away from Procter & Gamble and Citicorp. But dissecting the market to find new opportunities required access to detailed customer information—and though Brooklyn Union's system had the data, it wasn't capable of conveniently breaking it down in the myriad ways demanded by its marketers. "Everyone was complaining about the system," said Feraudo.

Not that it was any of Feraudo's concern; at the time he had nothing to do with IS. Although he had started out as a programmer in the early 1970s and risen quickly to manager of systems development, Brooklyn Union, sensing that it had in Feraudo the makings of a future senior executive, decided to move him around to different functions to help him learn the business. For 3 years he held positions in engineering, construction and other areas. But when the problems with the customer-information system reached crisis proportions in 1986, the board of directors decided it was time for him to get back to his IT roots—this time as top dog.

In tapping the blunt and decisive Feraudo, Brooklyn Union knew it wasn't going to get a lot of pussyfooting around. Feraudo, as usual, didn't disappoint. "I told them that sticking on a fancy front or back end to the system . . . would just be a way of not facing up to the real problems," he recounted. "I said we needed to build a new system from scratch. They agreed, until I told them I thought it would cost close to $50 million. They choked and told me to study the problem some more."

For nearly a year—a period he now refers to as "the bullshit year"—Feraudo doggedly stuck to his assessment that anything less than a complete rebuilding would be a waste of time.

Meanwhile, regulation continued to increase, and the company started losing market share to other utilities. Finally, in 1987, senior executives gave Feraudo the green light—under two conditions: "First, they told me to work as low as possible on the technology curve"—that is, to avoid depending on technologies that would be past their prime in a few years. "Second, they told me to make sure that they were never again confronted with a total monolithic conversion like this."

Meeting the first requirement forced Feraudo to consider passing up IBM's ubiquitous IMS database-management system for its designated successor, DB2. While that may not sound daring today, in 1987 DB2 was virtually experimental; the only production site was a bank in Denmark. There was little solid evidence that the new DBMS would provide adequate performance or reliability, and it lacked efficient utilities. "IMS would have been the smart choice in every way but one—it looked like it was going to be obsolete," explained Feraudo. He went with DB2.

TECHNICAL PROFILE

The **Brooklyn Union Gas Company** is a natural-gas utility that is also involved in gas exploration, production, cogeneration and pipeline construction. Based in Brooklyn, it supplies gas to over 1,100,000, mostly residential, accounts. In 1990 the company earned $93 million on revenues of $994 million; for 12 consecutive years it has earned or exceeded the maximum rate of return on common equity allowed by New York State. In 1990 Brooklyn Union brought online a massive integrated system based on an object-oriented architecture to replace an array of separate customer-account and field-service applications.

Large and Mid-range Systems: Brooklyn Union operates an IBM 3090/300J and an ES9000/620 mainframe; mid-range systems include an IBM 9370 Series I and a Digital Equipment Corp. VAX 4000.

Software: Most applications run under MVS/ESA, in CICS, IMS and DB2 environments. Third-party application software includes NOMAD 2, DIS, SAS and PROFS.

End-user Computing: The company supports over 2,000 terminals and PCs, as well as several hundred custom-built hand-held computers for field-service representatives. Most PCs are linked via Novell local area networks.

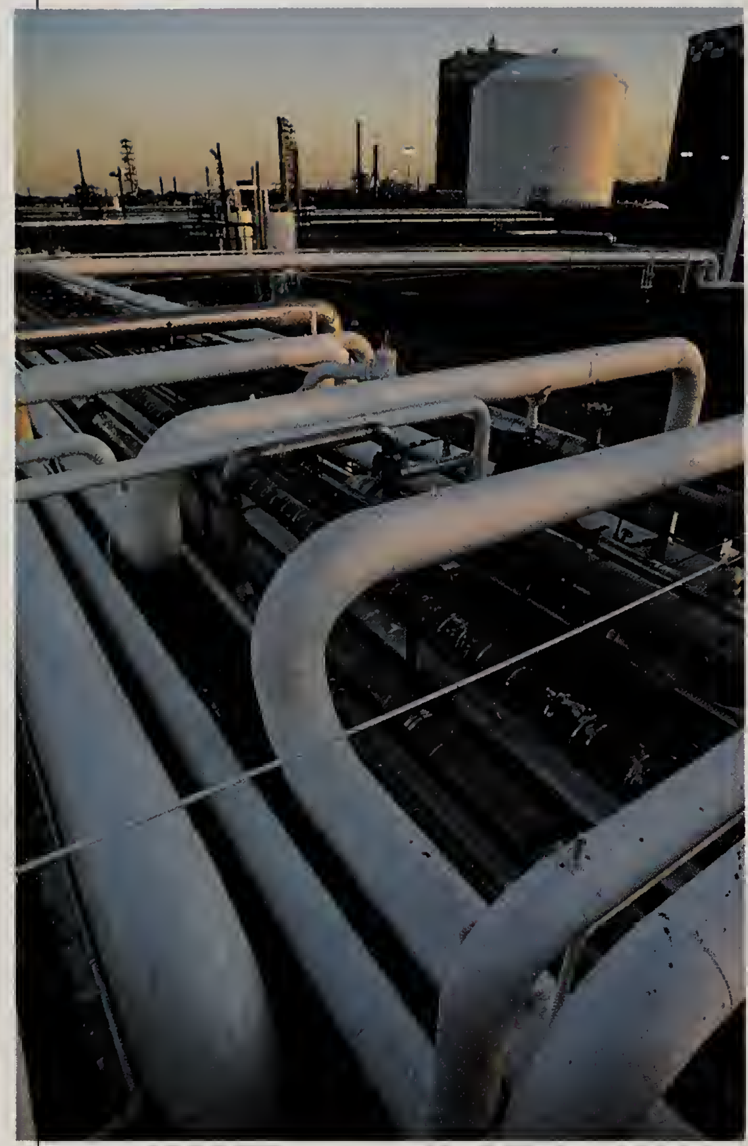
> *"It's amazing to walk down the aisles of a project this size and hear 200 programmers talking about business requirements instead of sub-routines."*
>
> *–Bill Feraudo*

Next Feraudo agonized over the second condition. Clearly, whatever the system looked like, it would have to undergo considerable change over the years as business requirements continued to evolve. Was there a way to fashion a system that could accept these changes without becoming kludgy?

There was, learned Feraudo. Object-oriented programming allows the construction of a system from almost entirely independent modules—modules that can be neatly and painlessly replaced when circumstances demand, much as a computer can be upgraded by replacing a circuit board. In addition, code used in one module can often be reused in new modules without modification, slashing development times and maintenance costs. And thousands of successful systems had been built with object-oriented programming.

Unfortunately all of those systems were PC-based; the biggest ran on minicomputers. "No one had ever used object-oriented programming to build a large, mainframe-based commercial application," said Feraudo. "We'd even have to develop our own programming tools. But if we used traditional programming techniques, we couldn't guarantee that we wouldn't end up with the same degraded monolithic problem." After ordering up a few small but highly successful practice applications based on object-oriented programming, Feraudo swallowed hard and gave it the nod. To further obviate the need to heavily modify or even discard the system due to business changes, Feraudo insisted on a layered architecture in which the code most likely to change would be isolated in the upper layers.

Through all of 1988 and most of 1989, 200 people—140 of them consultants—worked overtime on the system. But the object-orient-



BROOKLYN GAS, *which serves about 4 million customers, has a 450-person field-service crew to perform repairs, install equipment and respond to reports of gas leaks.*

ed approach was paying off. As end users produced the expected stream of additional features and changes they wanted incorporated in the system specs, Feraudo was stunned to find the programmers taking it in stride. "Traditionally as soon as the user starts talking, the programmer starts thinking, 'Oh God, now I have to deal with this sub-routine, which means I'm going to have to change that one, which will affect all those others. . . . ' But with an object-oriented approach, the data is separated from the programs, so it's usually just a matter of making some changes in a data table. It's amazing to walk down the aisles of a project this size and hear 200 programmers talking about business requirements instead of sub-routines."

In June 1989 the project reached a major milestone: The new system produced its first bill. "I waved it around," Feraudo recalled, "because these people really needed something to celebrate after working 12-hour days, seven days a week. What

I didn't tell them was that it took the system 40 seconds to produce that single bill, so we still had some work to do." Fortunately object-oriented programming separates program logic from performance considerations, so tweaking the system didn't require extensive retesting of all the code. The performance was brought up to spec within two weeks, instead of the several months that normally would have been required.

Still, although everything seemed on-track, the pressure on Feraudo and his team mounted. The tension peaked as the date for the four-day switchover to the new system approached; after the conversion weekend, Feraudo and his top managers slept on cots in their offices for two weeks. "We all knew our careers were on the line," he said. "This was for real. It had to work."

It did. Back in 1987 Feraudo had told executives the system would cost $45 million and would go online in November 1989. In the end it cost $47 million and went online in January 1990. Not too shabby, considering the dismal track record of large, commercial systems.

The impact of the new system is being felt throughout the company. Marketing people now get any type of extract they can dream up shipped to their PCs for manipulation. One recent excursion through the data turned up the horrifying—from Brooklyn Union's point of view—fact that all of New York City's schools were heated with oil. Marketing went to work, and now the city is in the process of converting all of its schools to natural-gas heat.

Up-to-the-minute information about the company's 3,000 largest accounts is downloaded daily onto account executives' laptop computers, to keep them apprised of every aspect of each customer's status as they make their rounds.

An automated voice system routes customer calls to the correct department. (Most of the 2 million calls a year are requests for account information, which can now be provided automatically.) Customers requesting repairs need only provide their name: The system automatically picks out the nearest crew available with the appropriate skills and equipment. The address, directions and service instructions are then shipped via radio to hand-held terminals carried by every field person.

The system also alerts managers to leak reports that have languished without response for more than a few minutes. Meter-reading has been largely automated too: Some meters now call in their numbers by telephone, while others broadcast them by radio when signalled by meter-reading vans cruising the streets.

Brooklyn Union's IS department considers itself one of the biggest winners. The object-oriented design is so much easier to debug than the old system that the task now requires only eight people, and that will soon shrink to six. It is also enabling the department to churn out enhancements in record time. Feraudo wants to eventually turn the data tables over to the users so they can implement modifications and enhancements themselves. "My dream is to get us out of the systems business," he said, "except for managing database integrity and providing utility services. We're not intellectually and culturally ready yet, but this system is a first step." CIO

David Freedman is a freelance writer based in Brookline, Mass.

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PROVING THE CASE

Costly software-development strategies put a greater burden on IS budgets, so it's important to be able to quantify the payoff of the investment—both to management and to IS professionals

BY RICHARD PASTORE

Proving the productivity and quality benefits of computer-aided software engineering (CASE) can be like trying to prove the subway is faster than a taxi at rush hour. You have a strong inkling that it is, but the logistics of verifying it dissuade you from even trying. Unfortunately, inklings may no longer be sufficient when it comes to justifying CASE or other expensive development strategies, as cost-conscious management increasingly demands to see real, measured value.

"Heuristic measurements may have been OK in the past, but these days there is more pressure to justify our expenditures and ensure that our investments are sensible and on the right track," said Richard Priory, senior vice president of generation and information services at Duke Power Co. in Charlotte, N.C. "History shows we haven't always made the most productive decisions, so I'm a strong believer in measuring productivity gains."

With IS budgets already shrivelling under the harsh glare of recession, the high cost of CASE only adds to the strain. "There is a lot of expense pressure. CASE is not inexpensive to bring in, and there is an even greater cost in getting it to be used properly," said Marc Linder, vice president of technology management services at Manufacturers Hanover Corp.'s Geoserve division in New York. Companies can expect to spend from $32,000 to upwards of $50,000 per IS professional to adopt a CASE strategy, consultants estimate.

Consequently interest in measurement is on an upswing. GTE Data Services Inc., in Tampa, Fla., has had a formal numeric measurement program since 1989 and finds its firsthand knowledge increasingly in demand by other CASE users. Systems Manager of Information Assets and Metrics Lou Gerstner lectures on the subject to CASE user groups: She said more managers are looking not only to justify CASE, but also to prove the value of their overall development strategies.

But there are obstacles to tracking programs both logistic and cultural. Figuring out what to measure is the first puzzler. Then there are few, if any, internationally accepted metric standards that apply to the various segments of CASE development. Changing IS culture to accept monitoring is a delicate matter in itself. And even if all these problems are solved, the tallies will be of little value unless the CIO knows how to convert internal, technical appraisals into terms business managers will understand (see related story, Page 33).

Largely because of these travails, fewer than 30 percent of Fortune 2,000 companies with or without CASE are doing any type of software-development measurement, according to Howard Rubin, president of Howard Rubin Associates Inc., a consulting firm based in Larchmont, N.Y. Even fewer are getting valid results.

Most firms that do track CASE benefits look at the general barometers of software productivity and quality. Test questions, which cover both objective and subjective metrics, boil down to the following points: Do CASE tools and methodologies allow IS to churn out applications faster? Is the code more error-free? Do the applications live up to user expectations? Are the systems easier to maintain through their life

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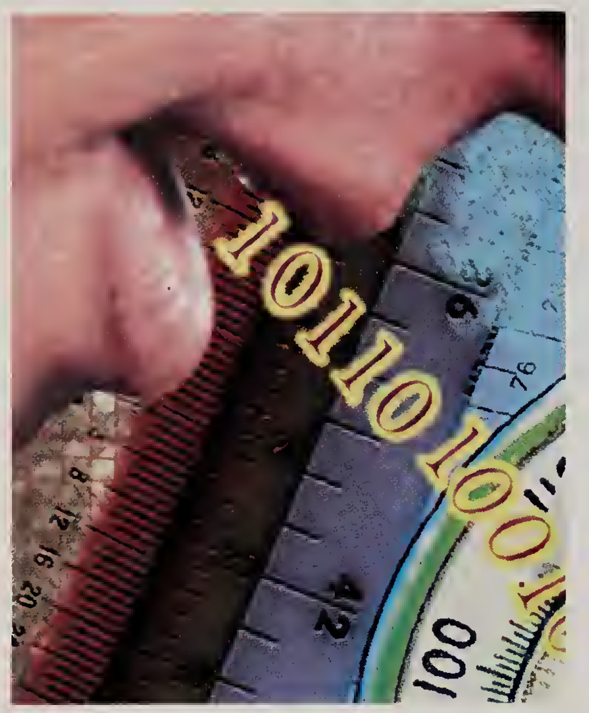

Today, differences in language complexity and the advent of code generators render line counts virtually meaningless. As an alternative, some companies have turned to function points.

cycle? Do the tools pay for themselves?

Counting lines of code was once the predominant productivity metric. Today, differences in language complexity and the advent of code generators render line counts virtually meaningless. As an alternative, some companies have turned to function points.

Function points, defined by IBM's A.J. Albrecht, apply weights to each of five development ingredients: inputs to a program (four points), outputs from a program (five points), user inquiries to a program (four points), file or database updates (10 points) and interfaces to other programs (seven points).

For projects of a given size range (roughly 5,000 to 100,000 Cobol source statements), CASE tools combined with structured methodologies and an experienced staff yield a median of 12 productivity function points per staff month. Without CASE, productivity dips 25 percent to an average of nine function points per month, according to studies conducted by Capers Jones, chairman of Software Productivity Research Inc. in Burlington, Mass., and author of *Applied Software Measurement: Assuring Productivity and Quality.*

Eastman Kodak Co. has measured with function points for nearly five years. Over that time the company has tracked productivity growth in excess of its goal of 5 percent per year, according to Margaret Tomczak, unit director in Kodak's management services division in Rochester, N.Y.

Not everyone endorses function points, however. The metric has been criticized for being overly difficult to interpret and administer consistently. Deere & Co., a farm and construction machinery manufacturer in Moline, Ill., has given up on them and is still looking for an alternative. "Our knowledge of function points and attempts to measure with them have not been as successful and exacting as we would like," said John Boten, manager of commercial sys-

Selected Measuring Tools

Though some CASE tools include limited software-metric capability, only a handful of third-party vendors sell separate software-measurement tools. The following list includes some of the more widely available packages.

COMPANY & LOCATION	PRODUCTS
Computer Power Group Inc. Oak Brook, Ill. 708 574-3030	**MARS (Metrics Analysis & Reporting System):** Measures software productivity and quality for CASE and non-CASE development. Price: $35,000 to $100,000, including consulting services.
Howard Rubin Associates Inc. Pound Ridge, N.Y. 914 764-4931	**RA-Metrics:** Tracks and reports on quality, user satisfaction, defects and historical comparisons. Price: $30,000 site license; $45,000 with consulting services. **FPXpert:** Knowledge-based function-point analysis and counting tool. Price: $30,000 site license; $45,000 with consulting services.
Quantitative Software Management McLean, Va. 703 790-0055	**PADS (Productivity Analysis Database System):** Compares software productivity and quality to benchmarks collected from U.S. and Europe. Price: $15,000 annual site license. **SLIM-Control:** Tracks productivity and quality in ongoing projects. Provides completion forecasts. Price: $25,000 annual site license.
Software Productivity Research Inc. Burlington, Mass. 617 273-0140	**Checkpoint:** Measures software quality and productivity based on function points. Price: $20,000.

tems. Deere, which has been working with CASE for more than two years, expects to realize a 50 percent productivity improvement. "But we don't have the metrics to demonstrate that we're really there," Boten said.

"Function points just aren't going to tell the whole story; there are too many variables," said Michael Ehrenzweig, vice president of investment technology planning and consulting in Metropolitan Life Insurance Co.'s investment information department in New York. "Any measurement program is not going to be an exact science because CASE isn't just a tool; it's a cultural change."

> *So-called 'soft' measures can illuminate cultural issues likely to be overlooked by a numeric system.*

Ehrenzweig instead chooses to work with "softer" measures, surveying internal customers and IS staff "who are the beneficiaries or victims of what we're doing with CASE," he said. This self-assessment illuminates such factors as the effects of retraining on the development process and staff acceptance—cultural issues that are likely to be overlooked by a numeric system, he contended.

CASE use today can impact productivity tomorrow. CASE-generated code, as well as screen and data definitions, are often suitable for reuse in future application projects. The result is savings in time and money, and another measurable benefit of CASE. GTE, for example, records the expense incurred for the original code development, then every time that element is "checked out" of the library and reused, the original cost

Metric Esperanto

If IS wants its users to understand performance measurements, it must start by establishing a common tongue

When talk turns to measurement, information systems executives speak of function points, delivery rates and defect densities. Senior management's lingo is more one of bottom lines, time to market and customer satisfaction. When trying to justify the value of CASE, the CIO must serve as a translator, making these incompatible dialects comprehensible to both groups.

Business managers at many firms have no concept of IS metrics. Simply presenting function-point tallies, however glowing they may be, will likely provoke a "so what?" from management.

"Frankly, my senior executives don't get very excited by the fact that our transaction time has gone down by one-tenth of a second," said Giorgio Sorani, division head of MIS at The Lubrizol Corp., a chemical manufacturer in Wickliffe, Ohio.

Some IS metrics can be translated directly into business benefits—time to a deliverable (IS measure) and time to market (business measure) being one example. But often it is not that simple, and in many cases the CIO must juggle sets of unrelated metrics. One way to sort these out is to talk with the various parties and draw up a scorecard for each, advised Howard Rubin, president of consulting firm Howard Rubin Associates Inc. in Larchmont, N.Y.

The scorecard should indicate how each vested interest—the CIO, the CEO, internal customers and external customers—would assess performance improvements. CIOs, for instance, are concerned with measures showing decreased cycle time. The CEO would prefer to see cost reductions. The internal customer favors timely and bug-free application delivery. And the external customer looks for cheaper, more reliable products or services.

Manufacturers Hanover Corp.'s Geoserve division is piloting this technique, called Audience Analysis. "It's useless to measure in function points if my constituency couldn't care less," said Marc Linder, vice president of technology management services in New York. "Depending on whether you're on the business or IS side, your objective in measurement is different."

Internal users can be helpful in translating CASE's IS benefits into business benefits. "We try to bring the users into the process; it's really the user who has to say, 'Here's what this can do for me,' " said Dale Fieldcamp, director of corporate information services at Caterpillar Inc. in East Peoria, Ill. "Users can generally quantify [the benefits] pretty well."

Once Lubrizol installs an application, it conducts a post-installation audit to determine the business benefits of the new system. An example, though not a CASE project, is the company's recent redesign of a purchasing and accounts-payable system. Sorani justified this redesign by showing that it reduced the number of steps in the accounts-payable process and led to a head-count reduction. "That's something my senior executives can relate to."

—R. Pastore

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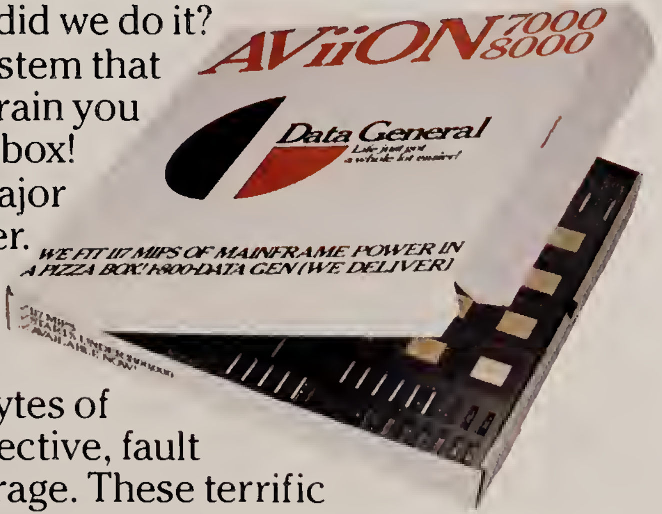
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According to Giorgio Sorani, measuring quality requires "looking at the number of interventions needed after a system is put into production." This reveals how well designers understood users' needs.

is logged in as savings.

CIOs also want to know if their CASE-developed applications fill the bill when it comes to quality. Software quality measurement usually means tracking defects—the number of times IS has to fix a bug or add a requested function to a supposedly completed system. Tomczak's Kodak unit records the defect rate per 1,000 lines of code.

"We look at the number of interventions needed after a system is put into production," said Giorgio Sorani, division head of MIS at The Lubrizol Corp., a chemical manufacturer in Wickliffe, Ohio. The tally tracks not only technical quality but how well the designers understood user needs from the outset. Systems designed with Texas Instruments Inc.'s Information Engineering Facility (IEF) have reduced their intervention rate by an order of magnitude, Sorani said. "To me, that's quality."

Some end users at Lubrizol share IS's interest in measuring CASE-derived quality. The corporate resource assurance division, which oversees the environmental safety of Lubrizol's chemical products, is working on its own metric plan while planning the specifications for its first CASE-developed application. "We want to compare existing chemical-material management systems with the new one [in terms of the] ease with which we can transmit data and add and change documentation," said Dave Pavlich, division head of corporate resource assurance.

Code complexity, another nuance of CASE development, also figures into software quality. Manufacturers Hanover's Geoserve division uses a packaged inspection tool to measure

An Airtight CASE

Timken uses metrics to make IS an offer it can't refuse

If CASE in your IS department is going over as well as some of George Bush's Supreme Court nominations, you might try drumming up enough evidence to make adoption an open-and-shut case. At Timken Co., where CASE has proven a tough sell internally, measurement will be used to build an airtight argument for CASE acceptance.

Because of the rigorous structure and discipline required by CASE, "we have had difficulty making any strides toward institutionalizing CASE [and] having it accepted by the whole spectrum of information technology professionals," said Donald Boron, general manager of information technology management.

The Canton, Ohio-based bearings manufacturer will try to prove that CASE is too good to resist by logging any improvements in software productivity and quality starting later this year. Hopefully this record will overcome pockets of IS resistance through sheer force of numbers, Boron said.

When finalized, the measurement program will likely use function points to track improvements in defect rates, maintenance costs and customer satisfaction, according to Boron. But he puts more emphasis on gauging quality because that, rather than productivity, was the company's primary reason for acquiring Knowledgeware Inc. CASE tools back in 1987, he said.

—R. Pastore

the complexity and structure of randomly selected code modules. "Then we can evaluate over time that our code is becoming more structured and less complex," which will facilitate maintenance and the ability to make quick changes, Linder said.

Whatever the metric, it can't provide meaningful data without a benchmark from traditionally developed applications. Kodak spent three years building up its baseline of traditional measures; Met Life established its own benchmark two years ago when it began adopting CASE. Other companies that have not quantified their earlier development efforts must play catch-up.

> *Some companies make the mistake of beginning their measurement programs too late in the process. Metrics should first be applied when planning begins.*

"We're trying to put in place our baseline of delivery rates on conventional and nonconventional applications," said Martin Bronstein, senior vice president of systems development for the First National Bank of Chicago's customer service group. "The bank has been working with IEF for two years. It takes a long time to put that stuff together."

When to measure is as key as what to measure. Within a specific CASE development project, companies often start measuring only when the actual coding gets underway. This is a mistake, according to Lawrence Bacon, senior vice president of IS at The Travelers Companies. "Typically, a whole lot of work goes on before people start measuring," Bacon said. For accuracy, metering should begin at the start of the planning sessions—which are often very time-consuming in large CASE projects. The Hartford, Conn.-based insurance company mistakenly applied its own metrics too late in the development cycle, Bacon admitted.

Besides concerns over what, how and when to measure, IS executives must consider that their staffs might not take kindly to being watched. "People could get a gut feeling that this can be used as a tool to judge and punish," said Dennis Barham, a technical consultant working on CASE measurement at Philadelphia insurance firm Cigna Corp. If that happens, they may not cooperate with the assessments or may even fudge the data to protect themselves.

To avoid undue paranoia and confusion, CIOs should spend time up front explaining their rationale. In some hard-hit industries like banking, measurement can be justified in terms of job security. "People don't like to be quantitatively evaluated," said Manufacturer's Linder. But IS must "understand that everybody's at risk as the bank continues to contract, [so] we have to demonstrate our efficiency and ability to deliver value."

At Kodak, Tomczak took pains to explain to her staff the whys and wherefores of the appraisal system. Nevertheless, when defect tracking began there was still resistance. "We didn't do a good job talking about the 'why' " up front, she said. She had to reiterate that the program was not a measure for the staff as individuals, but a method to improve the processes of the organization.

To remove some of the Big Brother element from measurement, companies could establish metric interest groups made up of project managers and end users. These groups could meet periodically to discuss the process and foster understanding and acceptance, said Jerrold M. Grochow, vice president at American Management Systems Inc., a consultancy in Arlington, Va.

It is also a good idea to devote a limited number of employees to oversee the metric program. This helps ensure that tallies will be conducted with greater consistency and accuracy. Kodak's management services division assigns one and a half full-time staff positions out of 450 to handle its program. First National Bank of Chicago has dedicated the same number to its efforts.

WHAT TO LOOK AT

Line-counting is no longer enough. Today IS departments are measuring numerous components, both objective and subjective, in order to document the benefits of CASE development.

PRODUCTIVITY

Labor costs

Mean time between project milestones

Adherence to cost estimates

User satisfaction with deliverable timetables

Staff satisfaction with development process

QUALITY

Defect density per lines of code

Defects per unit of time after system is installed

Complexity and structure of code modules

Maintenance time spent on application fixes

Percentage of reusable code

User satisfaction with delivered application

The goal of collecting data is to use it, said Lou Gerstner. "The whole point is to make historical measurements a focal point in the business process."

A Sound Investment

At GTE Data Services, the proof is in the program

Of the few CASE measurement programs operating in U.S. industry, GTE Data Services Inc.'s is one of the largest in scope and scale. A testament to escalating interest in measurement, talks on the topic by program manager Lou Gerstner have lately drawn standing-room-only crowds at CASE user conferences.

Gerstner, systems manager of information assets and metrics at the GTE Corp. subsidiary, heads a Tampa, Fla.-based group that includes seven people who do nothing but software measurement. Its mission during the past two years has been proving the value of development strategies and tools, including CASE.

So far the CASE tool, Pacbase from CGI Systems Inc., located in Pearl River, N.Y., has measured up. Cost savings realized from CASE development are on a par with the original cost/benefit analysis for this time frame. The resources devoted to measurement have also proven a sound investment.

"We are contributing far more than we cost," Gerstner said, noting that GTE keeps track of the money the program saves versus its cost to the company.

The company uses function points to quantify manpower requirements, milestone delivery rates, functionality and quality for CASE-developed applications. The aim is to boost productivity 30 percent overall every two years and to eliminate 95 percent of production defects. GTE Data has finished two major CASE applications; the productivity rate for the first showed little improvement over traditional development, but the second showed a 30 percent improvement.

Monthly measurement reports and analyses filter up to the president. The data is factored into top management decisions on the economic merits of buying, building or re-engineering applications. "The whole point is to make historical measurements a focal point in the business planning process," Gerstner said.

—R. Pastore

Establishing, explaining and conducting CASE measurement takes resources, a repellent notion in these lean times. Ideally, however, companies can minimize the additional overhead by building measurement into the development process, said consultant Rubin. He also advises replacing existing low-value metrics, such as collecting time cards, with high-value metrics, such as recording rate of delivery in function points.

"We try to ensure that measurement doesn't become labor intensive for the project teams by collecting data through existing tools," GTE Data's Gerstner said. Labor-cost tallies are pulled from an existing time-management system. Defect rates are pulled from a similar system.

In IS circles there is no universally accepted expenditure level for measurement. But other functions typically earmark 1 percent to 2 percent of a department's budget to calibration, according to consultant Grochow. "I don't think that's an outrageous investment; it will pay for itself through improvements in productivity and quality," he said. In some cases, the mere fact that work is being measured may furnish the incentive IS needs to push CASE to fulfill its true potential.

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In a marriage made at the point of sale, retailers and their suppliers are forming partnerships based on a mutual need for strategic information

STORE-CROSSED LOVERS

BY MEGHAN O'LEARY

They refer to themselves, jokingly, as soup and rag merchants. But today's retailers are as likely to be information power brokers who form manufacturing and distribution partnerships with their suppliers based on the value of data gathered at the point of sale. While technology is critical to gathering such information, working together is not purely a matter of technical cooperation. "I kind of regret that there's so much focus on the technol-

JOHN H. BRUNS: *"What I think people are waking up to is that the end customer is everyone's customer."*

PHOTO BY STEVE NIEDORF

RON GRIFFIN *says that cross-functional, cross-company re-engineering will be a major thrust for The Home Depot in the next five years. "We're trying to challenge all the processes that exist."*

PHOTO BY SONNY WILLIAMS

ogy in the first place," said Steven J. Johnson, managing partner of Andersen Consulting's retail industry practice in Chicago. "All of these technologies [EDI and POS systems] we're talking about are mature. The relationships are the hard part."

Both technology and the fruitful relationships it enables are more critical than ever in today's intensely competitive retail environment. Relatively slow market growth, except in certain niche markets, and flat population growth have resulted in overcapacity among retailers. "That effectively means that whoever is going to succeed at this is going to have to do a better job of targeting their market than anyone else," said Johnson. "Targeting often means getting at the forefront of a trend as it is happening, and that requires fast, flexible ordering and distribution. It used to be that [retailers] just sort of spread merchandise around." Today, retailers make extensive use of customer, credit and demographic information to make better and more timely merchandising decisions. According to Johnson, technology is the only way to handle so many variables and iterations.

The most technologically advanced retailers gather sales information via point-of-sale (POS) systems featuring scanners or laser guns that read bar codes on items sold. The systems may combine current sales information from each store with historical information, demographics or data on specific kinds of customers to determine which products are likely to sell. The POS system may also tie into inventory and ordering systems.

> *Automation is helping retailers and manufacturers form productive partnerships that will help them make the right decisions . . . to sell more merchandise.*

To support speed, flexibility and accuracy in ordering, distribution and billing, retailers and vendors use EDI of purchase orders, advance shipment notices and invoices. Electronic transmission opens the door for quick response (the retail equivalent of just-in-time), in which retailers place smaller, more frequent orders electronically, and suppliers' factories and warehouses are flexible enough to fill them. Quick response saves retailers the cost of warehousing and helps them stay fully stocked at all times.

But just automating manual tasks "isn't automation," said Tom Friedman, editor and publisher of *Retail Systems Alert,* a retail automation newsletter based in Newton Highlands, Mass. "Retailing is a process. Automating the decision-making process is what automation in retail is all about." Over the long term, automation is helping retailers and manufacturers form productive partnerships that will help them make the right decisions to sell more merchandise.

Dave Evans, vice president of IS for JCPenney Co. of Dallas, described his organization's ideal electronic-loop-cum-partnership, which integrates merchandise planning, ordering, order filling, delivery, distribution and front-end sales. But the promise of partnership goes well beyond improving the pipeline. The trend toward collecting POS data has caused an unexpected power shift from manufacturers to retailers, who are collecting gold mines of informa-

New Links in the Food Chain

The Retail Alliance hopes to add a gourmet flourish to the staples of supermarket information management

Although bar coding was first used in supermarkets, the majority of food retailers are not rushing to leverage their POS information the way non-supermarket retailers are. One reason is that supermarkets deal more in volume than in trends.

Traditionally, supermarkets have sold POS data to market research firms that repackaged it and sold it to manufacturers. Nevertheless, food retailers have begun to move toward better internal management of their information in order to improve the logistics of replenishment and reporting and to gradually move toward external links. With this in mind, Nielsen Marketing Research USA and GTE Interactive Services have announced The Retail Alliance, an Atlanta-based integrated service that will combine a database and network with replenishment and forecasting applications.

"The goal is to develop a systems architecture for communication of store information within a store and also between the store and the chain headquarters," said Tim Simmons, member of the executive management team of marketing for The Retail Alliance. That architecture can also connect the store to banks and credit organizations, as well as to manufacturers and warehouses. An in-store controller will pull together usually separate departmental communications lines within large supermarkets and set the stage for a single direct link to a warehouse or manufacturer. In many chains, stores send sales data and inventory requests through headquarters, which then forwards that information to the supplier. "This will enable the grocery industry to practice just-in-time inventory for the first time," Simmons said.

The Retail Alliance will also offer what Simmons calls a "store manager's workbench," a powerful PC that features retail software designed to handle decision making at the store level. The workbench will offer tools to assist the manager with decisions about replenishment, space management and product promotions, as well as labor scheduling.

The Retail Alliance is currently looking for local market leaders in the grocery, consumer package goods and drug retailing industries who "are accustomed to innovation and experimentation," said Simmons. A situation analysis of five retailers and 10 manufacturers was conducted last summer, and field tests will begin in the first half of 1992.

—M. O'Leary

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tion about which products really sell. Such information is extremely useful to manufacturers, and they are often willing to make extra efforts on behalf of retailers in order to obtain it.

David M. Carlson, senior vice president of corporate information systems for K mart Corp. in Troy, Mich., foresees a steady expansion of the discount retailer's relationships with suppliers. The company is inviting 200 of its largest vendors to participate in its Partners in Merchandise Flow program, in which K mart will give suppliers warehouse and POS purchase data in return for faster, more frequent deliveries. Carlson sees K mart's suppliers "working with us to do a better job of forecasting demand for their product."

In pre-POS days, both retailers and their suppliers relied on market research information provided by vendors. "I can remember business briefings with some of the manufacturers and they'd say, 'Here's how our product is selling in other areas, and you're not selling or ordering enough,' " recalled the CIO for a large grocery chain. It was a psychological battle, he added, because retailers didn't really know what was selling. In light of this history, he mused that partnering with vendors can make one feel like a male black widow spider about to mate. "You know you've got to do it; you just hope you survive the experience."

> *The trend toward collecting POS data has caused an unexpected power shift from manufacturers to retailers, who are collecting gold mines of information about which products really sell.*

Because it was so general, such sales information was also unreliable. "The best information [a supplier] can have is information on what sold yesterday," Carlson said. That's the kind of information retailers have. It can be combined with data on promotions or seasonal events to build sales and promotional histories. Knowledge is power and a strategic tool for the retailer or manufacturer who knows how many Teenage Mutant Ninja Turtle action figures the Atlanta store sold yesterday morning. "What I think people are waking up to is that, first of all, the end customer is everyone's customer," said John H. Bruns, director of MIS planning and information architecture for the department store division of Dayton Hudson Corp. in Minneapolis. Partnerships are based on the common goal of making greater profits from serving that customer better.

The technology issues surrounding partnering sound like a legislative debate on seat belts. POS systems,

The Hot Spotters

Despite technology's value for retailers, no expert system can predict which way hemlines will go

Merchandising, buying or trendspotting: Call it what you will. In the retail industry it's all part of the same goal, to stock what's "in" when it's in, and to avoid getting stuck with merchandise that doesn't sell. Buyers often rely on retail systems that collect data on what sells in their stores; they feed that data into automatic replenishment systems that generate orders and adjust inventories. Technology "takes away from the buyers some of the more mundane, routine aspects of their jobs and allows them to focus on other parts, such as seasonal or high fashion merchandise," explained John H. Bruns, director of MIS planning and information architecture for the department store division of Dayton Hudson Corp. in Minneapolis.

But to what extent can technology support the "art" of forecasting—of determining that chartreuse will dominate wardrobes next year, or that shapeless retro-'60s dresses are going to enjoy an inexplicable resurgence in popularity?

Successful merchandising is "really a matter of being aware of the trends for the areas in which [one] buys," said Robert G. Bradley, senior vice president of information services for PACE Membership Warehouse Inc. in Denver. "That's what the buyers get paid the big bucks for. That's the art. Where the science comes in is more in the replenishment decisions."

"Technology allows us to be much closer to a trend," said David M. Carlson, senior vice president of corporate information systems for K mart Corp. in Troy, Mich. "But there are trends that turn out to be fads. It's like anything else. A person is probably no better than his talent and no worse than his worst tools.

"Tools can really put a new level of support under the competency of a decision-maker," he continued, "but you'd like to believe that you have some people with a talent for sniffing out trends, whatever [their] method, whether it's thumbing through the *Ladies' Home Journal* in the john or watching *thirtysomething* at night." —*M. O'Leary*

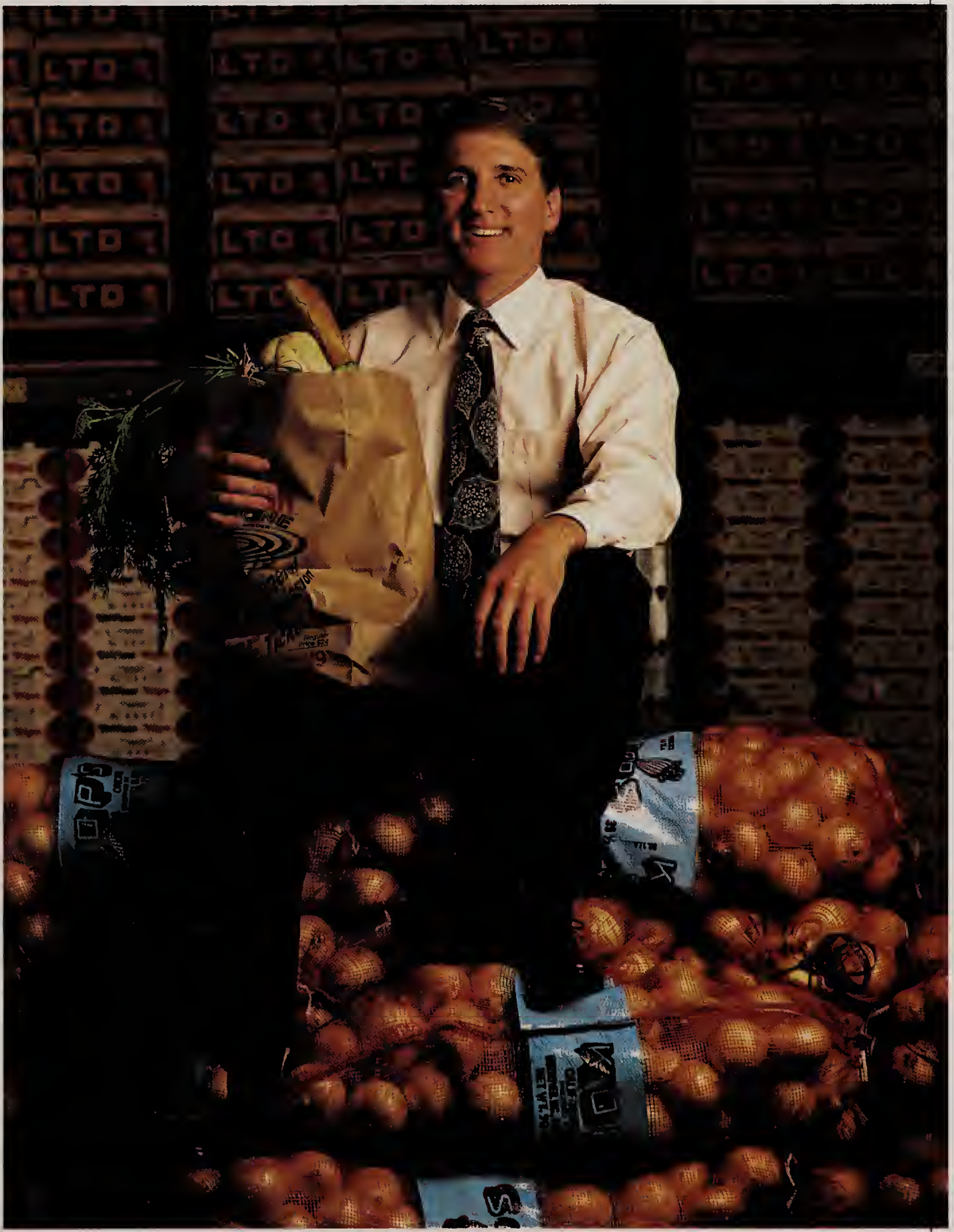
EDI and quick response are based on available, tested technologies, and the players know they work. The trick is getting everyone to use them. One impediment for many retailers is the cost of installing scanning systems. In addition, many items are still manufactured without the seemingly ubiquitous bar code. "It's very difficult to come up with a reliable analysis of non-scanned products," said Edwin R. Gropp, group vice president of MIS for Ralphs Grocery in Compton, Calif. Retailers in partnership with vendors may push for bar codes on every item.

"We had some problems with the fact that a large amount of goods that flow through our home center are not typically [bar coded]," said Ron Griffin, director of information services for The Home Depot Inc., a retail home improvement store based in Atlanta. Partnership with its vendors (as well as its high volume ordering) allowed The Home Depot to ask for, and get, bar codes on two-by-fours.

But the system is still not perfect. When a bar code doesn't scan on the first try, Gropp continued, "a perfect cashier would key in the UPC [Universal Product Code]. But when it's very busy, they're going to sit there and ring up 'grocery.' Well, now we have lost track of the fact that the customer has bought [that particular item]."

The manufacturer's contribution to a technology partnership doesn't end at bar codes, according to JCPenney's Evans. He asserts that quick response won't work if retailers are practicing it while suppliers are keeping warehouses full of goods. "That doesn't make the process more efficient," he said.

Improving efficiency requires a more thoughtful look at the business processes retailing technologies are designed to support, according to Andersen Consulting's Johnson. "That's where you'll see people re-engineering the . . . business processes of both partners," he said. Then "it becomes obvious that there are things that retailers and vendors do that cause one another to incur additional costs or time in their processes. That requires a much greater depth of understanding. You really have to spend time understanding your partner's



EDWIN R. GROPP: *"There have been a lot of issues in the industry that have bred a certain amount of distrust between retailers and vendors. You still have the same players."*

PHOTO BY ALAN LEVENSON

STEVEN J. JOHNSON: *"I kind of regret that there's so much focus on the technology in the first place. All of these technologies we're talking about are mature. The relationships are the hard part."*

capabilities and strengths, as they need to do yours."

"It's a very, very complex undertaking," agreed Dayton Hudson's Bruns, "because it involves many players: retailers, manufacturers, suppliers to manufacturers." It also involves the merchandising, distribution, sales, marketing and IS organizations of two different companies. Bruns' division has put together a cross-functional team to address logistics and quick response, and to educate people in each organization about the kinds of process changes necessary to make the partnership happen. He points to ordering frequency as an example. "Some resources only want you to order up once a month, yet the benefit of quick response is that you can order more frequently in smaller amounts and keep your inventory levels lower. Obviously there's going to be a change."

Cross-functional, cross-company re-engineering is going to be a major thrust for The Home Depot in the next five years, Griffin said. "We're trying to challenge all the processes that exist and say, 'Does this process need to exist?' We find we're able to eliminate some processes by building in controls early on."

Retailers and vendors also have some historical handicaps to overcome. They both make money by driving hard bargains, Johnson acknowledges. Deals and penalties are integral to driving costs down for one party, "and now we're supposed to be partners. I occasionally feel like Henry Kissinger doing shuttle diplomacy," he said. "It's very tough for these groups to come together. The essence of this process is really a mutual re-engineering. I've got to link my processes with yours and achieve better overall productivity."

> *"It's very tough for retailers and vendors to come together. The essence of this process is really a mutual re-engineering."*
>
> *–Steven J. Johnson*

Food retailers and their suppliers, for example, are well known for their long-standing adversarial relationship. "There have been a lot of issues in the industry that have bred a certain amount of distrust and suspicion on both sides," said Ralphs' Gropp. The industry may be grappling with a new concept of partnership, he said, "but you still have the same players." In the end, retailers' and manufacturers' willingness to negotiate heretofore non-negotiable terms comes down to their common objective. As one consultant put it: "The name of the game is turns, and the person with the highest number of turns wins the game." CIO

PHOTO BY NEIL MACDONALD

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BEAT THE REAPER

Ailing companies can sometimes cheat death by means of a well-managed turnaround effort, with IS playing a critical role in the rejuvenation

BY
THOMAS KIELY

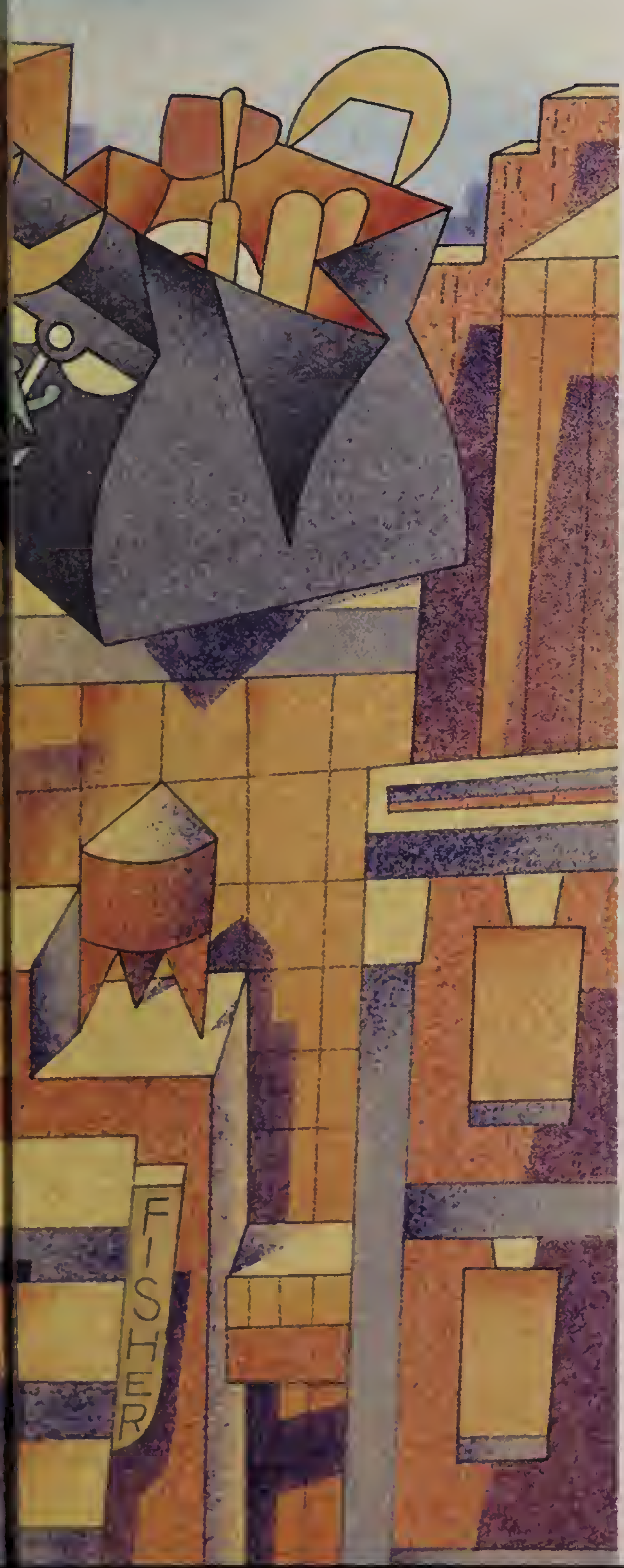

ILLUSTRATION BY MARK FISHER

In the mid-1980s, investors and the press intoned final rites over Storage Technology Corp., a Louisville, Colo.-based manufacturer of computer memory storage peripherals. The company grew fast in the 1970s, but began to bleed red ink soon after the decade changed. In October 1984 Storage Technology sought refuge from its creditors in Chapter 11. With $700 million in IOUs and fast-eroding markets for its key products, the prospects looked grim. Pessimists inside and outside the company smelled lilies. Amen.

That isn't how the story went, however. By January 1985, turnaround veteran Ryal Poppa was chairman of Storage Technology (the company's founder, Jesse Aweida, stepped down). Poppa immediately consolidated lines, dumped costly projects, sold assets and slashed the payroll. The former IBM salesman refocused the company's core business. He pushed a nifty niche product that began to earn some revenues—and the buzzards went hungry. Storage Technology emerged from bankruptcy in July 1987, and today has recaptured the level of profits and revenues it enjoyed in its heyday.

Information systems played an important role in the turnaround, according to Storage Technology's director of management information systems, Richard Nortnik. IS supported the company as it downsized, redid the architecture to meet the reorganized company's needs and provided the volumes of information required of companies in bankruptcy proceedings. The IS group also enjoyed a turnaround in its own credibility within the company.

That's a pretty good summary of the CIO's role in a turnaround, say IS executives at other Lazarus-like firms. New senior managers—sometimes including the CIO—chart a fresh course for the troubled company. In many instances the company cannot navigate that altered course without the substantial contributions of IS. For the CIO this means providing for critical new information needs (often with diminished resources), maintaining daily IS operations and managing shocked and despondent employees—all while laying the groundwork for change, often dramatic change, in the role IS will play in a new organization, should the turnaround succeed.

It is a role an increasing number of IS executives must assume. Last year alone, about 20,000 U.S. businesses went bankrupt. While most of these are mom-and-pop shops, Christopher Beard, publisher at the Beard Group, a Washington research and publishing firm that tracks troubled companies, pointed out that 15 of the 25 largest bankruptcy filings in U.S. history have occurred within the last 18 months. These include airlines such as Pan Am and Continental, Drexel Burnham Lambert Group Inc. and LTV Corp.

The ranks of troubled U.S. companies are not exclusive to those that file for protection from their creditors. John Gabarro, a turnaround expert on the faculty of the Harvard Business School, defines the potential pool of turnarounds as those companies, or operating units, that are losing money—Wang Laboratories Inc., for example. Gabarro, author of a book on turnarounds, *The Dynamics of Taking Charge,* noted that the number of turnaround attempts (successful or not) by U.S. companies has increased in recent years. "In the decade of the 1980s, many U.S. companies had to deal head-on with competition from overseas," he said. "This resulted in declining performance in many instances." Declining performance prompted managers to downsize, restructure, or otherwise change the company's spots. Also, an abundance of restructuring and LBOs in the 1980s produced a bevy of debt-ridden companies. "They've got to generate cash to service the debt, so [often] they've got to do an operational restructuring to accomplish this," Gabarro said. "A lot of these are viewed as turnarounds."

> *"There has to be an understanding across the organization about where you want to drive the train. Then you have to have a vehicle, in the form of an architecture, that communicates the vision, so that you can get the organization to buy into it—both in IS and in the business units."*
>
> *–Richard Nortnik*

By and large, though, companies get into trouble because managers wait too long to correct problems, said C. Charles Bahr, chairman of Bahr International Inc., a Dallas-based turnaround consultancy (see related story, Page 56). The typical problems any company might encounter include a gradual insensitivity to customers, misjudgment at the end of product cycles and a host of other perils. Too often, Bahr said, managers find they are unable to identify the problem (or may even deny that a problem exists). "A turnaround is nothing other than what should have been done in the first place as a matter of course," Bahr asserted.

Storage Technology's problem in the early 1980s was rapidly changing markets and a few misguided (and costly) R&D projects. Management, distracted by the company's startling growth, missed important cues. "The company was trying to be too many things to too many people," said Nortnik, who joined the company in 1987, a few months before it left Chapter 11. "Storage Technology had a wide variety of initiatives going on across the computer horizon. It didn't have control processes in place to tell them that they were getting into trouble."

A large part of the blame for this fell on IS, Nortnik recalled. "IS took more lumps than it probably should have. It was focused on as being a culprit." The company's business unit managers considered IS overstaffed, expensive and inept. Even after the company filed for Chapter 11 and began to reorganize, Nortnik said, "the general feeling was that IS was not focused on the tactical and strategic efforts that were necessary to move the company forward into a new way of doing business."

As a result, IS has had to effect its own turnaround within the larger organization. At the same time it had to grapple with the demands placed upon it by the larger organization's crisis, such as providing much of the background data required by the bankruptcy proceedings. Additionally, IS had to support the company as it shuddered through a tremendous downsizing—shedding nearly half of its 15,000 employees, and several layers of management. IS suffered comparable layoffs too.

Much has changed in the last four years—for both IS and Storage Technology. Where once IS was a stovepipe in a vertically managed organization, it is now a participant in cross-functional projects. "That change is a major cultural change for our organization," Nortnik said. "And we continue to go through it. We're getting better at it, but it's been a very difficult process."

Nortnik has also introduced some rigor to the department. "The IS organization was marked by a lack of engineering-type processes," he said. "The department was pretty loose in the way systems were developed and implemented. Part of that was that a lot of IS activity was going on outside of IS. We consolidated all that, and then found that there were many procedures and processes that just weren't in place." Now those processes, such as change control, security and other basics, *are* in place.

IS has also labored on building a new architecture for Storage Technology. Nortnik said that aside from all the obvious reasons for doing an architecture—an organization needs to understand the road it's taking, even if the final destination is hazy—developing an architecture will help the CIO in a turnaround "to lead the organization through a major change. There's got to be a vision. There has to be an understanding across the organization about where you want to drive the train. Then you have to have a vehicle, in the form of an architecture, that communicates the vision, so that you can get the organization to buy into it—both in IS and in the business units."

The exercise required the involvement of business unit managers (to define data needs)—who now have a much better sense of the role IS plays. IS also gained kudos within the company for its implementation of a new WAN. And in turn, IS has gained a sense of place at Storage Technology—the IS staff feels it is contributing to the organization.

Nortnik has also tried to get IS staff involved in the marketing unit's efforts, and recently helped the company land its biggest contract ever. The U.S. Defense Logistics Agency

Vision is the key to a turnaround. "You have to let people know where you are, where you're going, and where they fit into that."

–Fred Lyons

Building a Better Butterfly

Sometimes IS must undergo a complete metamorphosis to help its company cope with change

CIOs at companies that are undergoing a dramatic change in business face some of the same issues as their colleagues involved in turnarounds. For example, Paul Taylor is vice president of information services at Minneapolis-based International Multifoods Corp., a company in the process of transforming its entire U.S. operations. When Taylor talks about the role IS plays in his company's metamorphosis, it is like hearing echoes from a turnaround: vision, support, communication and the increased visibility of IS within the organization.

Since 1984 Multifoods has shed many of its food and milling companies and replaced them with food service operations and speciality food concerns. (The company's Canadian and Venezuelan operations remain unchanged.) In the old Multifoods, the data center was the hub of IS activity. It ran all corporate applications and handled most of the business applications for the U.S. operating units.

But Multifoods began to change too rapidly for a centralized IS to assimilate the new concerns. IS needed a new role if it was to adequately support the company's new vision. Ultimately, it made more sense to ground the information in each business. The data center could continue to control corporate applications while assuming the new role of consultant to business units.

In 1987 Multifoods decided to decentralize, but the task has proved to be enormous; expensive, too, representing 10 to 15 percent of the corporation's total capital spending for the last three years. And the task continues. Taylor said communicating the new role of IS to the businesses was very important in the early stages of decentralization. The culture of his organization has become more participatory and collaborative. And the relationship between IS and the business units is still evolving: IS now has to "sell" technology to customers. But Taylor thinks IS has gained stature in the business units too. As the decentralized organizations grapple with their own data, they are learning to appreciate how strategic information can become. *–T. Kiely*

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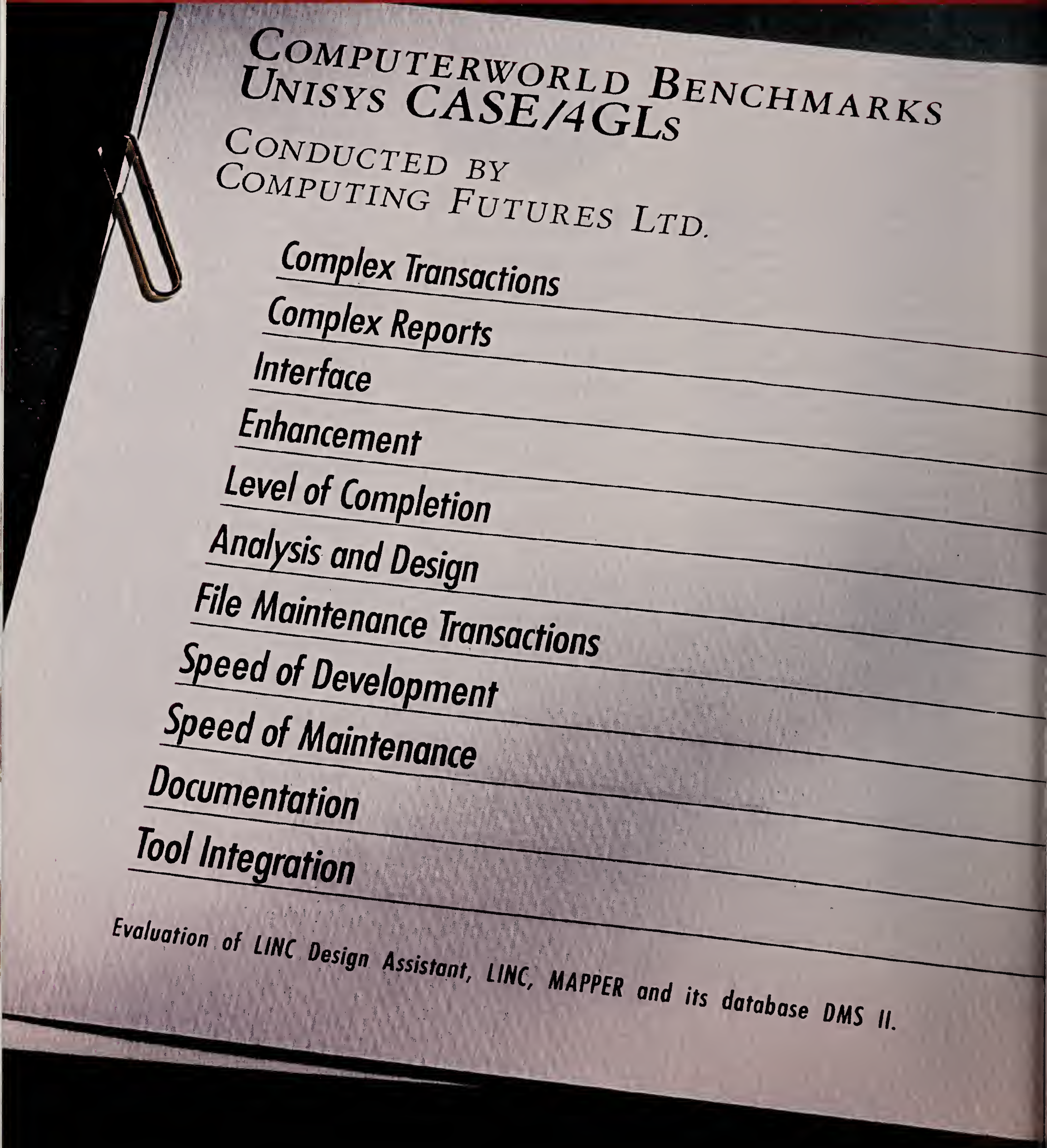

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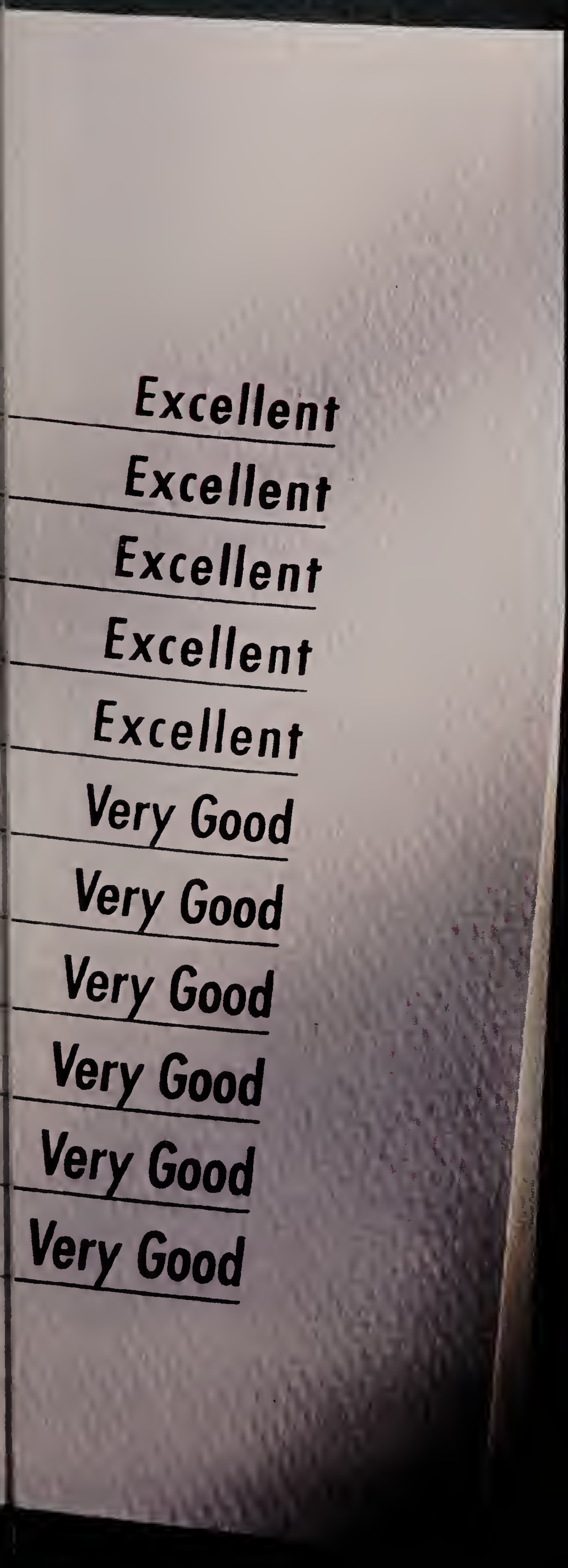

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was interested in Storage Technology's automatic tape cartridge libraries, and in the fall of 1990, Nortnik's staff benchmarked the product for the government at Storage Technology's data center. The agency thereafter signed a $52 million contract with Storage Technology, and IS received a lot of pats on the back within the company. It was a turnaround within a turnaround.

Still, the changes have not been easy, Nortnik admitted. IS folks are often the most resistant to change. While the company's crisis helped to force changes in the organization (and now the IS group's successes help to perpetuate those changes), turnaround "was a very painful process," Nortnik said. "What has been a disappointing surprise to some of our people is that when we came out of Chapter, all of our challenges didn't go away. As a company in an industry that's changing rapidly, the challenges [we face on this side of Chapter] are just that much more intense. The changes that were started in Chapter were just that—a start. This is one of the most challenging—if not the most challenging—positions I've ever held."

IS was also a critical abettor in turnarounds at Texaco Inc. and Perry Drug Stores. Texaco, headquartered in Harrison, N.Y., filed for Chapter 11 in 1987 when the company was required to pay $11.1 billion to Pennzoil in a court settlement arising from the two companies' battle over the purchase of Getty Oil. Eventually Texaco paid Pennzoil about a third that amount, and sold off more than $6 billion in assets. Texaco also had to fight off a hostile raid by Carl Icahn. The oil company emerged from bankruptcy just this past January.

"The highest strategic role IS played [in the last four years] was communication—period," said James Metzger, general manager of information technology. (Metzger, who has been in his current position since the end of 1989, was a director of the company's corporate services, and later of international units, during this period.)

At Texaco, IS has responsibility for both communications and telecommunications, Metzger said, "so IS did a lot of the work providing information to [senior managers], and communicating with employees and shareholders. There was a tremendous amount of information needed, and IS had to pull this information together outside the normal flow of information needed to run the company's daily operations." IS had to plan for and manage deadlines for all the financial, legal, and tax information required on an ad hoc basis—a demanding task. But Metzger believes that the efforts of the IS staff have helped to foster "a positive understanding [within senior management] of the value of accurate and timely information. Before this, senior managers were aware of how important information is. But now there is a real understanding of the *strategic* value of information."

At Perry Drug Stores, a Michigan chain of over 200 outlets headquartered in Pontiac, IS is an anvil for the company's evolving turnaround. The

Recognizing the Symptoms

Companies wishing to avoid major surgery should practice self-diagnosis and early treatment

Turnaround specialist C. Charles Bahr asserts that the best way to survive a turnaround is to avoid having to do one in the first place. To do that says Bahr, chairman of Bahr International Inc., a Dallas-based turnaround consultancy that has managed over 100 turnarounds in the last decade, companies should watch for the following warning signs.

"Companies get into trouble when they begin to believe their own BS," Bahr said. Rah-rah rhetoric can overwhelm judgment, and companies "forget their weaknesses." Reality warps. They misread their customers and downplay their own limitations or their competitors' strengths. When problems arise they ignore them, deny them, or make excuses for them.

Another sign of a troubled company is a fragmented management team. "Everyone runs into their own corner," Bahr said. Managers hide behind projects, retreat to their functions. There is no cohesiveness—no commonality.

And beware of business processes where form suffocates content ("this is the way things are done here"), so that employees go through the motions without achieving desired results. Bahr also warns that unrealistic numbers, such as the value of inventory or of a future contract, are a typical sign that managers have lost touch with reality—call it opportunistic self-delusion.

There are also factors common to successful turnarounds. Harvard Business School Professor John Gabarro said that in the well-wrought turnaround, the newly appointed general manager quickly negotiates a mandate with the parent organization on what needs to be done, and often has greater than normal leeway in carrying out that mandate. Successful turnaround managers are usually very effective at building a new management team, and are adept at communicating the new "vision" throughout the organization.

Turnaround managers drafted from within the industry succeed more often than outsiders do, Gabarro noted. Speed is critical, and the learning curve for an outsider can be daunting; outsiders may make mistakes about competition, distribution channels or product downsizing. *–T. Kiely*

“Within the next 10 years, both the structure of organizations and the jobs of the senior people within organizations will be drastically changed, primarily because of information. This will require information responsibility from everybody, especially from senior management.”

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company ran into troubles from overexpansion and from misjudging the competition. The vision for the turnaround came from the company's founder and CEO, Jack Robinson, and from president and COO David Schwartz. But to marry the business strategy for that vision to nuts and bolts technology, they hired Fred Lyons, a former senior manager at Coopers & Lybrand's Information Technology Group in Dallas. Lyons is at work on beefed-up point-of-sale systems, data capture and inventory management.

Vision is the key to a turnaround, Lyons said. "You need to communicate that vision to people in the company. It takes time to do this right. You have to let people know where you are, where you're going, and where they fit into that. It's a real problem—maybe more of a problem than some guys will fess up to."

At Sea-Land Service Inc. of Elizabeth, N.J., IS embodies that new vision. The shipping company encountered difficulties in the '80s, partly because of overcapacity in the industry and partly because of foreign competition. Moreover, it was bought, sold and raided several times (Sea-Land is currently a wholly owned subsidiary of CSX Corp.), making long-term strategic decisions almost impossible. Would the company be broken up and sold in pieces? What would the organization look like? For how long? IS suffered too: The technology staff could do little effective work in an organization beset with uncertainty. Morale was low throughout the company.

In late 1988 the company gained a new chairman, Alex Mandl, and soon after, a sense of direction. Historically, the performance of the shipping industry has been dismal, for a variety of reasons. Mandl's solution was to redefine the company so that it did not rely solely upon ocean shipping—but used its massive ocean shipping and port organization as a leverage to become a global point-to-point logistics and distribution outfit. Information systems is the only way to accomplish this: global networks, EDI, expert systems, integrated data.

> *"The most important thing is to provide a sense of direction, a sense that there's a mission that people are charged with that's important to the company. We wound up with much greater clarity on the part of individuals as to what their charter was and how they fit into the larger organization."*
>
> *–John Parker*

When John Parker arrived at Sea-Land in January 1990 to become senior vice president of information resources, a massive restructuring was already underway. Mandl reorganized Sea-Land trade lanes and cut several layers of managers out of the company. "The most important thing is to provide a sense of direction, a sense that there's a mission [that people] are charged with that's important to the company," Parker said. Mandl made changes, "but we wound up with much greater clarity on the part of individuals as to what their charter was, and then also how they fit into the larger organization."

Parker followed suit in IS. He spent his first month and a half studying how IS was organized, and decided he didn't like it. IS was split up into platform groups—mainframe groups, minicomputer groups, project groups. But users had no idea whom to communicate problems to, and often got different stories from different groups.

"We redesigned the planning process," Parker said. "As a result of the restructuring the company went through last year, we decentralized most of the organization. Although we have decentralized line organizations, they still have a great degree of interdependence because of the operational interconnections of the overall business network. So the one element of the company we didn't decentralize is information resources—because in a sense we're the glue that holds the rest of the company together."

Parker created a new position within IS: information resource account managers, who act as liaisons with the line organizations. Like IBM account managers, the new Sea-Land IS managers are supposed to understand their customer requirements and act as a translator for the actual systems development organization (see "A Partner Is Born," *CIO*, February 1991). "We built the whole planning process around that liaison function," Parker said.

At Sea-Land, IS becomes involved in nearly all business activities, including business ventures, new initiatives, joint ventures with other companies and new customer services. For example, Sea-Land recently signed a deal with the Soviet government to use the Trans-Siberian railroad as a Sea-Land bridge from Asia to Europe, and IS was involved in the deal from the start.

As an indication of how IS is regarded by Mandl and other senior Sea-Land managers (Parker reports to Mandl), Parker recalled that "last year when we went into our budget presentation, we went in with a proposal which was something above what the guidelines were. And when I came out of the budget review, I had more resources than I'd asked for. It occurred to me that was kind of a new experience." CIO

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Worth the Wait

For all the hoopla surrounding the non-arrival of ISDN, the technology has been quietly proving itself to a core of satisfied users

BY H. PARIS BURSTYN

The arrival of the integrated services digital network (ISDN) has been imminent for so long that potential users might dismiss it as another example of vendor-propagated vapor. But as developments in technology, applications, and standards and compatibility converge, the time may be right for ISDN's widespread acceptance and implementation.

And ISDN is proving worth the wait, according to a recent survey of MIS and telecommunications managers by Business Research Group (BRG) of Newton, Mass. Eighty-seven percent of respondents who have implemented ISDN reported a return on their investment. And while apprehension still exists, the majority of all respondents said they believe that ISDN delivers a competitive advantage by enhancing customer-service applications.

But several important questions remain. What capabilities will this new technology enable? How will it change the way organizations do business? What if a local carrier does not provide ISDN? Vendors and potential users alike must examine these concerns.

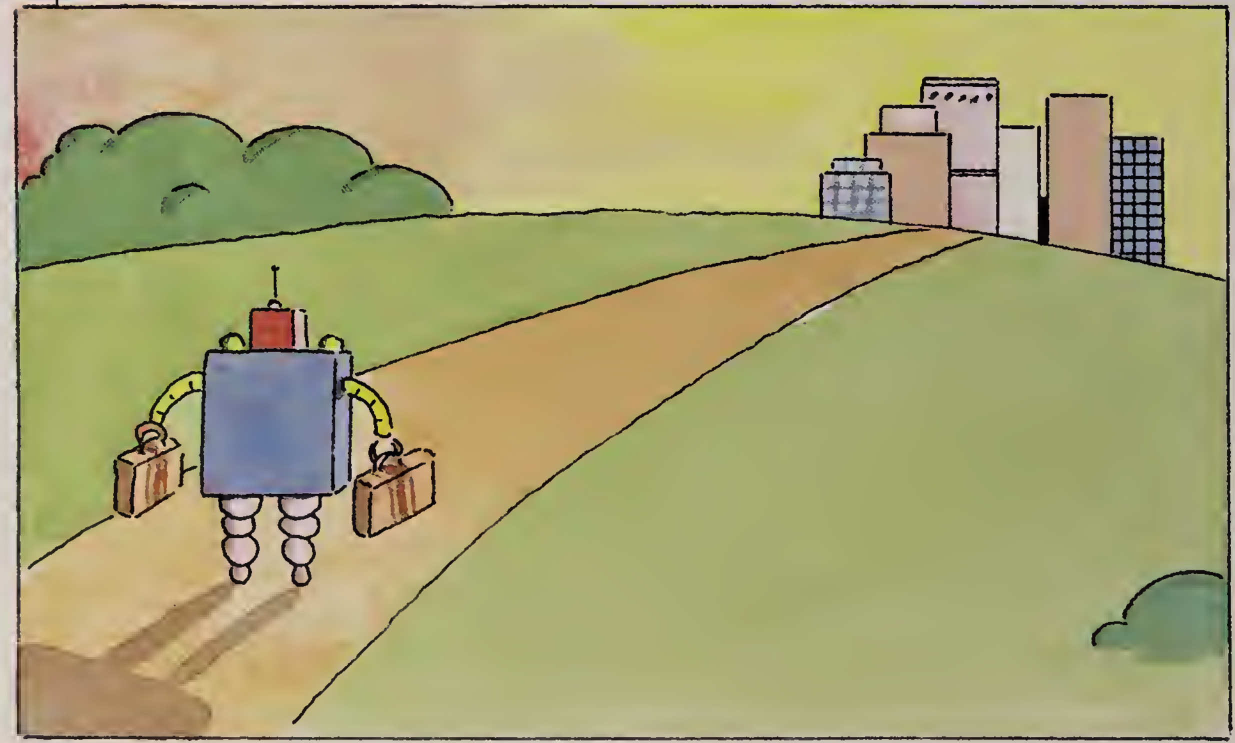
ISDN is not a technology per se but an international standard that defines access methods to a digital telecommunications network and allows voice, video and data to travel over the same facility. Many companies can integrate voice and data applications without ISDN through computer-assisted telephony (CAT), which allows telephone and computer resources to work together to support business applications.

What makes ISDN an improvement over current CAT technology is flexibility. With ISDN users have considerable control over telecommunications services including 800/900, ANI, WATS and packet-switched data. Users can reconfigure their mix of services on an as-needed basis. For example, a WATS line can be switched to an 800 line during peak times.

By combining information provided over the telecommunications network with data residing on their computers and PBXs, customers can use ISDN to create new integrated voice, data, image and text applications. These applications take advantage of the network's signalling system and standard ISDN interfaces. The digital interfaces and formats result in higher speeds and greater accuracy in transmitting information.

Although ISDN penetration is low, many companies currently use CAT to obtain ISDN-like capabilities. The links among computer, telephone and application may use ISDN, but ISDN is not required.

The survey sample was deliberately skewed to include only companies likely to use, or currently using, CAT or ISDN, since users already familiar with integrating voice and data applications could pro-



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vide greater insight into developing applications. Of the 200 respondents, 23 percent currently use integrated voice and data applications; 77 percent are potential users; 7 percent currently use ISDN; and 56 percent will potentially use ISDN.

Current users employ CAT and ISDN primarily for customer service because such applications are extremely cost-effective. Most of these users have departments with banks of operators: CAT delivers voice calls to their telephones as data files are simultaneously delivered to their terminals. But survey results demonstrate a move toward more bandwidth-intensive data applications such as videoconferencing. Nearly half of all CAT users plan to implement videoconferencing applications within the next 24 months. Other applications supported by CAT include telemarketing, accounts payable/receivable and marketing.

Since ISDN has been more available through the interexchange carriers (IXCs) than the local exchange carriers (LECs), far more companies report having primary-rate interface (PRI) capability than basic-rate interface (BRI) capability. BRI provides three separate digital channels (two 64 Kbps B channels and one 16 Kbps D channel) totaling 144 Kbps of bandwidth; PRI combines 23 B channels and one D channel, each with a capacity of 64 Kbps. BRI will most likely work best with desktop and point-of-sale applications while PRI provides the capacity for multiple logical connections. With the D channel, PRI provides more flexibility and efficiency than a T1 with comparable bandwidth, and BRI provides a more adaptable workstation environment than a standard telephone line.

Currently, customers requiring ubiquitous ISDN across LEC boundaries must use PRI-based offerings from AT&T, US Sprint or MCI. IXCs can update their networks much faster than the LECs, which suffer from more intense budgetary and regulatory restrictions. AT&T, which announced its ISDN service before MCI and US Sprint, currently supplies more ISDN PRI lines than the other two IXCs combined. All three companies report increased demand; by the end of 1991, over 1,000 PRI lines will be deployed.

What makes ISDN an improvement over current CAT technology is flexibility. With ISDN users have considerable control over telecommunications services.

By 1995 more than half of the access lines in the local exchange network will be digital and 3 percent of all access lines will be equipped for ISDN. More importantly, nearly three-quarters of all access lines will be linked by signaling system 7, the actual basis for intelligent network services, including ISDN.

The regional Bell holding companies want to make current ISDN deployment ubiquitous—they expect 22 million lines will have access to ISDN by the end of 1991. However, only about 1 million of these lines were shipped by the switch manufacturers through 1990, and BRG estimates that only 18,600 are actually in use.

Despite these discrepancies, the majority of customers who request ISDN will be able to get service because the access lines are being deployed strategically in metropolitan areas. Even if local carriers do not offer ISDN, any company can get it by bypassing the local carrier and using a long-distance carrier.

Hindrances respondents see to implementing integrated voice and data applications include up-front costs (61 percent), vendor incompatibility (57 percent), applications availability (53 percent), standards development (52 percent) and service availability.

Up-front costs primarily consist of equipment such as PBXs, phone sets, multiplexers and software. Fortunately the cost of such equipment is often negotiable. Compatibility concerns are more critical and difficult to resolve, but the Corporation for Open Systems International, a group of telecommunications companies, hopes to alleviate such problems with the formation of National ISDN 1.

With specifications developed by Bellcore, National ISDN 1 calls for computer and communications vendors and local and long-distance telephone companies to deliver products and services based on a common set of ISDN specifications by the end of 1992. A number of equipment suppliers, including AT&T Network Systems, Northern Telecom, IBM and Digital, are already committed to meeting the ISDN 1 standard. If this group achieves its goal, telephone companies should be more eager to deploy ISDN technology.

As ISDN becomes more widely available, applications should follow suit. Larry Lutton, a product manager at Nabnasset Corp., a third-party software and systems integration company in Littleton, Mass., expects the applications market to grow at around 30 percent a year. "Right now ISDN applications are lagging behind the technology," Lutton said, "but as ISDN is getting tariffed and offered by the phone companies, the applications will pick up."

Lutton sees two major opportunities for ISDN: improving customer service and the customers' perception of the company, and reducing the cost of doing business over the telephone. As for users, Lutton believes that ISDN must be driven by specific business needs. "Unless a company has a business opportunity, they are not going to buy ISDN."

The telephone is increasingly being used as the only contact between a company and its customers. Obviously any tool or technology that improves the functionality of telecommunications is going to have a positive impact on customer service. ISDN has the capability to improve the current level of service as well as supporting new applications. By using ISDN, companies can provide old-world personalized service with a very new-world technology.

H. Paris Burstyn is vice president of telecommunications research and consulting of the Business Research Group in Newton, Mass.

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Checkpoint release 2.0 can generate project estimates from as few as a dozen inputs. A function-point approximator makes reliable project sizing available earlier than previously possible. Query and assessment functions can now be performed on data collected from multiple projects.

Checkpoint is priced at $20,000, and a 30-day evaluation copy is available. It runs on IBM-compatible personal computers with 530K bytes of memory. For more information contact Software Productivity Research in Burlington, Mass., at 617 273-0140.

Multimedia Multiplicity

It seems as though every third product we hear about these days has something to do with multimedia computing. Indeed, multimedia has been getting a lot of ink lately as a technology (or, more accurately, a bundle of technologies) to watch in the coming decade.

One product that may make watching easier is NEC Technologies Inc.'s PC-VCR, a souped-up videocassette recorder that enables users to capture DOS or Macintosh screen output to VHS or Super-VHS tape. One of the virtues of the tape approach is that it is vastly less expensive than videodiscs, and thus well within reach of schools and other budget-strapped organizations. A key capability of the unit is its PC-controlled frame-by-frame editing function, which also enables tape locations to be encoded for easy search and access. The PC can serve as the control point for all tape transport. Tapes compiled and edited on the PC-VCR are playable on any VHS tape deck. The NEC PC-VCR retails for $2,100. NEC also offers DOS- and Mac-based software toolkits for creating multimedia presentations; both toolkits list for $149.95. For further information, call 708 860-9500 or 800 562-5200, ext. NEC.

Safe and Sound

A security system that relies on user passwords is about as secure as a locked car with open windows. Now a Cambridge, Mass., company has developed a two-stage computer-protection system that even the fussy National Security Agency likes. Security Dynamics Inc. peddles what it calls access control and encryption (ACE) technology. Essentially, the ACE system consists of two "locks": a software package or hardware device that sits between a host or server and incoming data lines, and a credit-card-sized identification token. The token (dubbed "SecurID"), sports a small LCD that displays a code unique to each system user. The two locks are synchronized by an algorithm that fabricates an unpredictable code, which changes every 60 seconds. End users gain access to the system by plugging in their personal password and the code displayed on their identification card. Security Dynamics offers a range of products for mainframe or network security, starting at $5000. For more information call 617 547-7820.

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Emboldened by its recent string of profitable quarters, Data General Corp. has staked its money and reputation on AViiON network servers that support most other major hardware brands and network standards and platforms. To ensure the broadest interoperability, DG has unveiled some 30 compatibility products.

The Westboro, Mass.-based firm will now sell, support and run versions of Novell Inc.'s Netware, Microsoft Corp.'s LAN Manager and AT&T's LAN Manager/X. DG also added coverage for the Apple Computer Inc. Macintosh. This software provides links between the server and Macintosh desktops over Ethernet, Appletalk or Token Ring standards.

AViiON will also connect to the major large system platforms: Digital Equipment Corp.'s VAX via DECnet, and IBM's Applications System/400 or 9370 via its Systems Network Architecture Token Ring product. The AViiON line already supported various Unix incarnations.

Network protocols characterize the balance of DG's new offerings, including software products supporting X.400, X.25, TCP/IP and Simple Network Management Protocol. For more information call 508 898-2684.

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OFF THE SHELF

EVERY MANAGER'S GUIDE TO INFORMATION TECHNOLOGY

By Peter G.W. Keen
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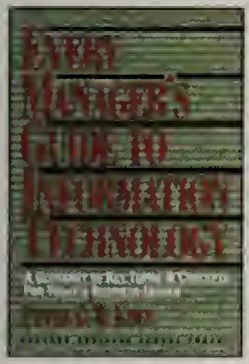


If you're looking to beat the Christmas rush, Peter Keen has written a fine stocking stuffer for your CEO (or any other non-IS executive with an IT-related need-to-know). *Every Manager's Guide to Information Technology* does what no other glossary of technology terms has yet (to our knowledge) attempted: The book hitches its lucid definitions of key IT terms and concepts to the business value inherent in understanding them—and using the relevant technologies well.

Thus a roughly two-page entry on database management systems includes marginalia on the Royal Bank of Canada's remarkable 40 percent response rate to its highly targeted promotional mailings—a result made possible by the excellent use of customer demographic and historical data. In his introduction, in fact, Keen stresses that he has written "a book about business, not technology." The glossary is highly selective; compiled, Keen writes, in order to concentrate upon terms "where business management understanding of them can contribute to business opportunities and decisions, and to creating an effective dialogue with IT planners and managers."

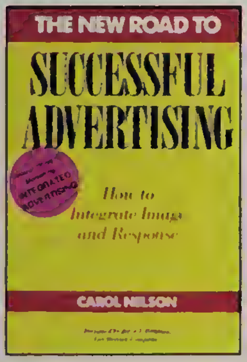
Though the mix is eclectic, Keen's perspective is ever-faithful to the business-value premise. He capably defines such common networking devices as "Bridges, Routers and Gateways," but also pointedly observes that their makers owe a hefty percentage of their livelihood to the failure of user companies to plan coherent architectures. (Keen repeatedly drives home the need to craft a comprehensive IT architecture, noting the huge sums of back-end money spent profligately to remedy companies' ill-considered or piecemeal "economies.") The entry on very small aperture terminals—VSATs—has little to do with satellite technology per se, but much to do with its cost benefits to, and strategic application by, such companies as Frito-Lay, CNN, Child World and K mart—where the cost of reaching the chain's 2,200 stores is reckoned at 50 cents per hour per store.

We are bound by ethics to disclose the fact that author Keen is well known to *CIO*, having been both a frequent source and contributor to these pages. But we don't regard this fact as disqualifying our good opinion of his book. *Every Manager's Guide* is equal parts primer and tract, in which each definition holds a small piece of a larger truth that grows clearer the more one reads: that IT is not just the sum of its inscrutable jargon; it is an aggregate business tool about which businesspeople had better know at least this digestible minimum.

THE NEW ROAD TO SUCCESSFUL ADVERTISING

How to Integrate Image and Response

By Carol Nelson
Bonus Books Inc. (Chicago), 1991
213 pages, $24.95



A nerd couldn't do it for hamburgers. A glistening, bikini-clad model couldn't do it for scotch. But a visible phone number, personal message and well-managed database could do it for your product, according to consultant Carol Nelson, author of *The New Road to Successful Advertising.*

Nelson argues that advertising and marketing professionals are so concerned with chasing industry awards and courting the favor of their peers that they've lost sight of their raison d'être—producing sales. Clients are spending enormous sums of money for evocative, cutting-edge ads designed to please the eye or tease the mind rather than persuade consumers to purchase a particular product or service. The image of a Naturalizer pump artfully posed against the green felt of a pool table amidst brightly colored balls would make a great poster for any wall, but it's not going to sell a lot of shoes.

The book is a rallying cry for an integrated approach to marketing. Nelson advocates the fusion of conventional image advertising with the tools of direct response. This marriage of "creativity and salesmanship" succeeds, Nelson explains, because it targets an audience, delivers a compelling personal message, and then gives that audience a way to respond. Too often one of these elements is emphasized at the expense of others, with the result that the message gets across to the wrong person, or doesn't get across at all. "In *your* position it's required," proclaims a cellular phone ad appearing in a women's magazine—and depicting a man using the product. A Christmas promotion for Chivas Regal devotes four magazine pages to a clever die-cut wheel device, then buries information about its limited gift edition in fine print at the end.

Nelson also discusses the need to integrate new technology into advertising, from the use of demo disks and online videotext to the niche-identifying capabilities of database marketing. (The author believes that products like Lotus Marketplace, withdrawn by the company earlier this year because of invasion of privacy complaints, will become commonplace in the near future.)

Nelson's book will undoubtedly generate some lively debate in marketing departments and advertising agencies. But it should also interest anyone who supports or interacts professionally with marketers, or is in any way involved with the not-so-gentle art of selling. So, if you're looking for a fun, frank and occasionally fractious take on the subject of advertising, well, you got the right one, baby. Uh-huh.

"Every day, uploads from our POS terminals had to squeeze through a 1200-baud modem to get to the mainframe."

—Telecommunications Manager

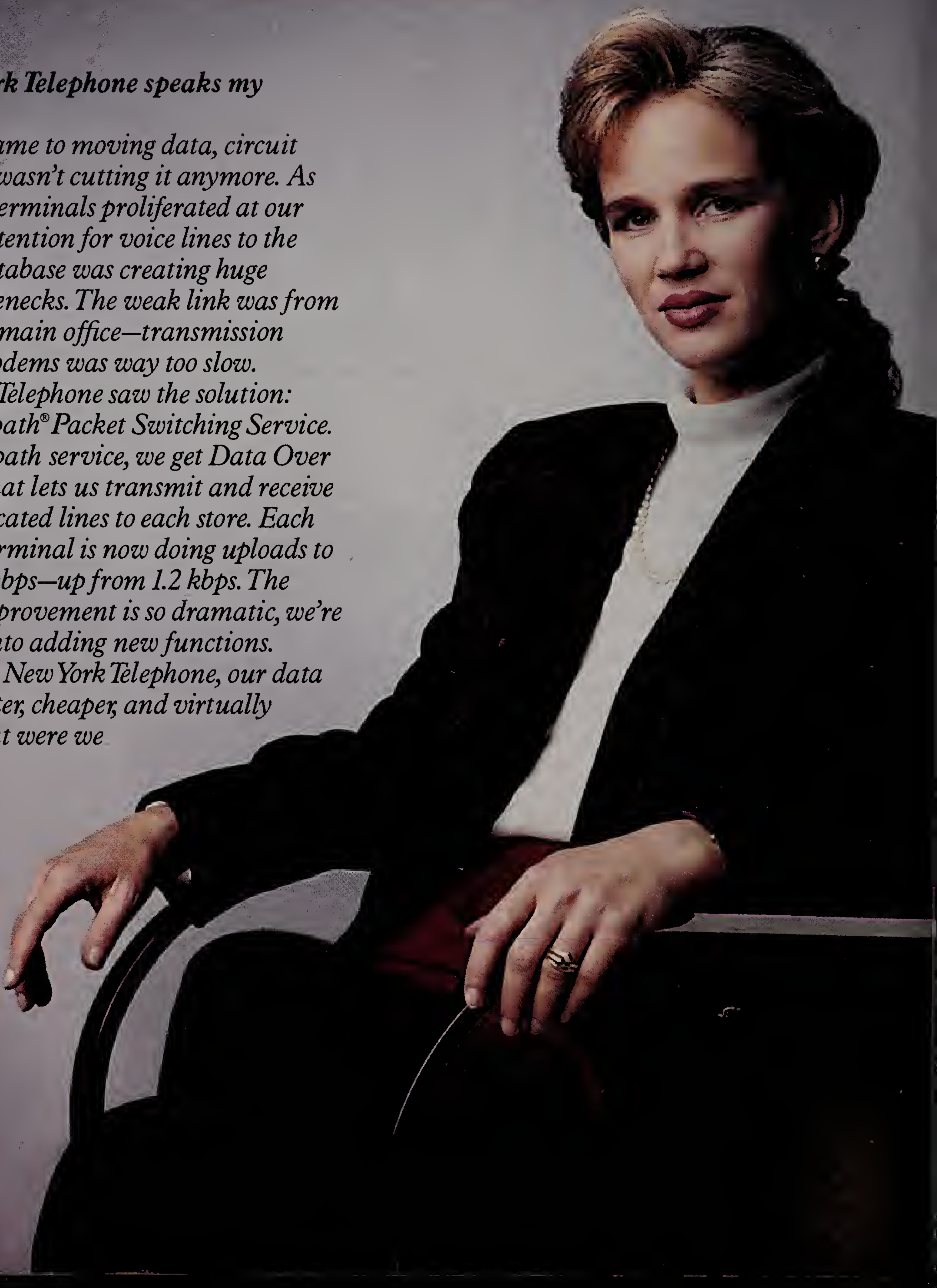
New York Telephone speaks my language.

When it came to moving data, circuit switching just wasn't cutting it anymore. As Point-of-Sale terminals proliferated at our retail sites, contention for voice lines to the mainframe database was creating huge reporting bottlenecks. The weak link was from the store to the main office—transmission through the modems was way too slow.

New York Telephone saw the solution: NYNEX Infopath® Packet Switching Service.

With Infopath service, we get Data Over Voice service that lets us transmit and receive data over dedicated lines to each store. Each remote POS terminal is now doing uploads to the host at 9.6 kbps—up from 1.2 kbps. The throughput improvement is so dramatic, we're even looking into adding new functions.

Thanks to New York Telephone, our data now moves faster, cheaper, and virtually error-free. What were we waiting for?



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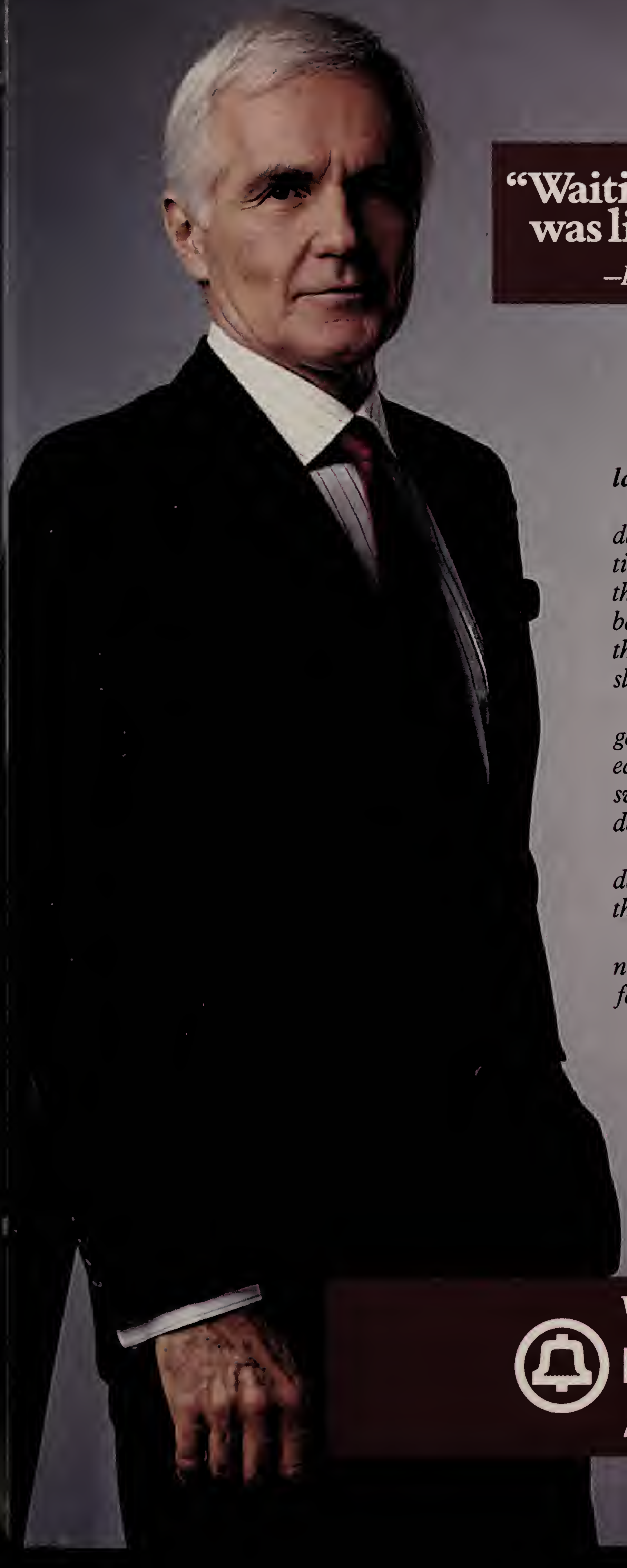


"Waiting for our daily reports was like watching grass grow."

—President

New York Telephone speaks my language.

A retail business relies heavily on end-of-day field reports. We spent a lot of money putting advanced systems in every store, in part so that our database here at headquarters could be updated on a timely basis. Unfortunately, the links from the stores to headquarters were slowing things to a crawl.

We called in New York Telephone. They gave us data lines between headquarters and each branch. They also introduced us to packet switching, a far more efficient way of moving data.

The results were dramatic. Our end-of-day reports now come in many times faster than they used to.

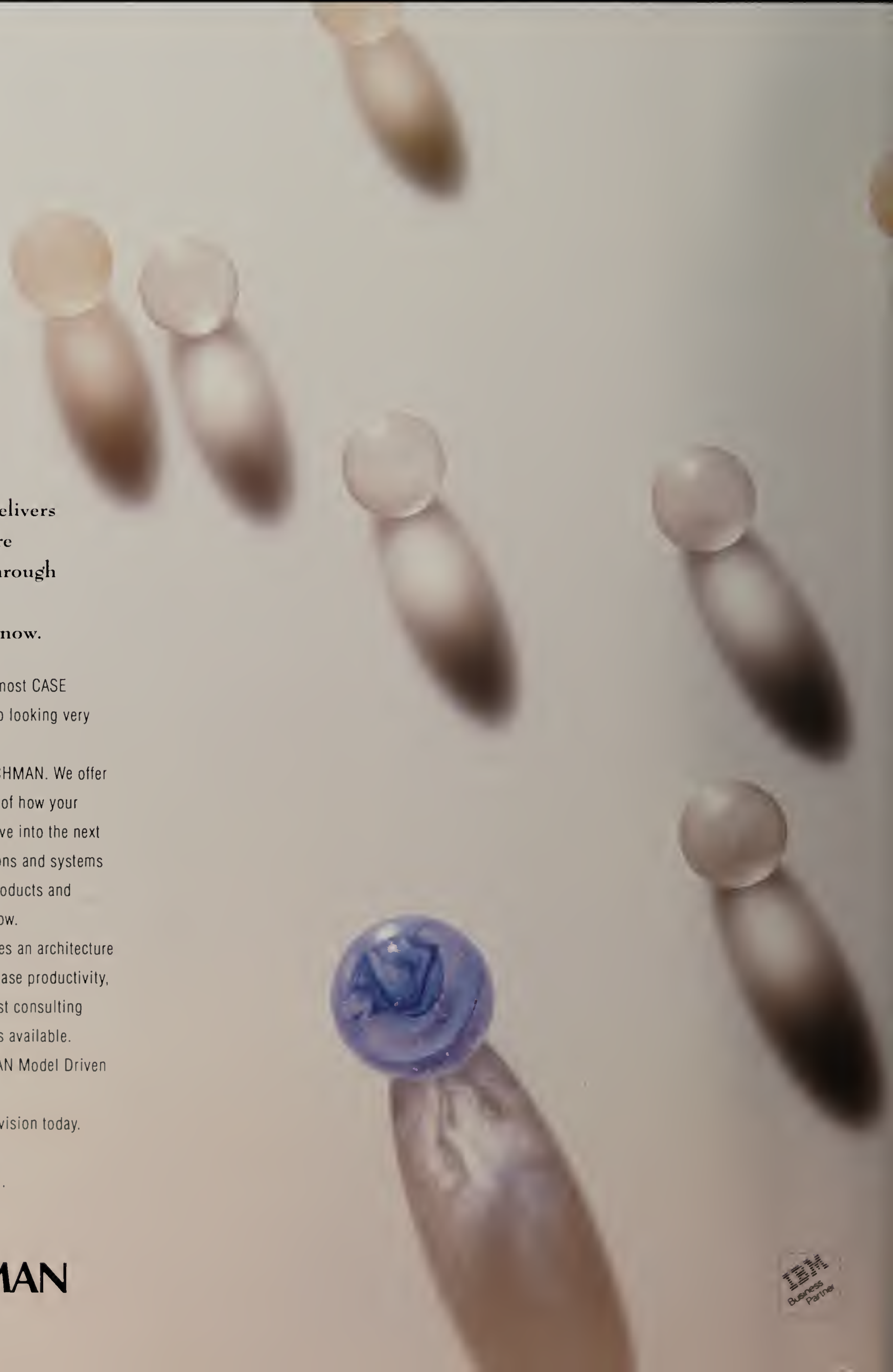
Thanks to New York Telephone, we're now acting on our reports instead of waiting for them.

For more information about Infopath Service, contact one of our authorized sales agents, or call New York Telephone at 1-800-942-1212, Operator 20.

We're all connected.

New York Telephone

A **NYNEX**® Company



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